# The Commercial Car Journal

VOLUME XIX

PHILADELPHIA, MAY 15, 1920

**NUMBER 3** 

# Truck Transportation Feature of Chamber of Commerce Meeting

Increased Production, Labor Situation, Good Roads and Other Business Topics
Are Thoroughly Discussed

By A. V. COMINGS

ERY gratifying results may well be expected from the strong showing made by the motor truck industry before the United States Chamber of Commerce in its session at Atlantic City April 28th. Under the general subject head of transportation as it affects production in this country, the motor truck was proved a transportation utility second only to the steam railroads of the United States, and so thoroughly was the case of the motor truck presented both by manufacturer and user that great good to the future of this method of transportation will undoubtedly result.

Fresh from recent demonstrations of the great usefulness of the motor truck in solving their transportation difficulties during the railroad strike, the manufacturers, business men, bankers and others that make up the Chamber membership, leading men in all walks of life from every corner of the country, were in a receptive frame of mind, and they were shown a picture of what motor trucks have done and may do for this country in speeding up its transportation that gave them real food for thought. They were given sound economical reasons for greater expansion of this infant among transportation mediums, and their influence in their various communities in furthering motor truck haulage should have a real effect on the development of this utility.

## Transportation Subject Matter

George M. Graham, general sales manager of the Pierce-Arrow Motor Car Company, by tacit agreement the spokesman of the motor truck industry of America today, was one of the four speakers on the subject of "Transportation in relation to production," which took up the morning session. The others were George A. Post, who spoke for the railroads; John H. Pardee, who spoke for the electric railway systems, and Admiral William S. Benson, who spoke for the merchant marine.

Mr. Post and Mr. Pardee, in their talks on the rail systems, said much that helped the case of the motor truck. Mr. Post stated that the steam railways are today carrying more tonnage and more passengers than at any time during the war, yet were in immediate need of four thousand locomotives, two hundred thousand freight cars and eight thousand pas-

senger cars. And the railroads can get neither the money nor the steel necessary for this expansion.

Mr. Pardee pointed out the desperate situation in which the electric railways have found themselves, with systems badly run down and with extensions needed everywhere, and with their "usefulness halted by their inability to secure funds."

#### Graham Outlines Future of Industry

Against the drab background painted by the railway representatives, Mr. Graham's picture of the motor truck's place in our transportation system was a brilliant outline of what the future may hold for this new utility.

"An infant in transportation dares rear its voice," was Mr. Graham's opening sentence, and he contrasted the infant with the youth, as typified by electric railways, and the graybeard, the steam roads.

The greatest good to the greatest number will come through the extension of what ex-Secretary Redfield called our trinity of transportation, the railways, the waterways and the highways, thinks Mr. Graham, and he said that he realized that this new transportation method has the follies, as well as the strength of youth. It also has the possibilities.

"The highways of our country connect directly with more homes than all the railways or waterways combined. There are fifteen hundred miles of waterways in this country, eighteen thousand miles of suburban electric railways, two hundred and fifty-nine thousand miles of steam roads, and two million seven hundred and fifty-three thousand miles of highways, of which 12 per cent are passably developed. Yet even this 12 per cent is more than all the railways of the country. Surely there must be a way to lend these highways to greater production."

Quoting present estimates of the annual tonnage carried by motor trucks, Mr. Graham said it seems considerable, but is really neglible when one figures what the potentialities of the truck are in the future. "You business men have not yet sensed the great development of the motor truck," said he.

Mr. Graham then sketched something of the work he did during the war in Washington, in getting the truck on the priorities list as an essential, and pointed out that the war industries board was shown where the motor truck was an absolute necessity in sixty-six out of the seventy-one essential industries listed by the board. He stated also that this held almost equally true of passenger cars, and that transportation over our highways can never be properly discussed without taking into consideration the place now held by the passenger car.

Mr. Graham quoted C. A. Morse as saying that handling short haul L. C. L. freight by steam roads is an economical error, and a Pennsylvania railway official as saying that all L. C. L. freight handled up to forty miles is handled at a loss to the railroads.

"As much time must elapse before our railways can be brought up to standard, is it not sound business policy to limit the present locomotives and cars to handling only profitable business," ask Mr. Graham.

"The railways need have no fear that we will build up a rival to them with motor trucks. It is preposterous to call the motor truck a rival of the steam roads on long hauls."

## Trucks an Aid to the Railroads

But Mr. Graham thinks that short-line railroads now operating at a loss, should give way to motor truck lines that may be operated at a profit. He stated that two-thirds of the present short line roads are located where they have no economical right to be, and that no economical error can be bolstered up permanently. Mr. Graham gave some interesting short-line roalroad figures to prove his statements.

"The dictatorship of distribution was shown by the recent railroad strike," said Mr. Graham, and proceeded to show how the intelligent uses of motor trucks at Motthaven and at Cincinnati has simplified terminal congestion on two railroad centers at least. Two stations within the Cincinnati belt formerly two days and fourteen hours apart by freight car, are now fourteen minutes apart by motor truck, and Mr. Graham stated that if the Cincinnati system could be installed in New York it would save the merchants of that city \$45,000,000 a year.

In calling attention to the efforts now being made to saddle all road expense

(Continued on page 114)

## Columbus Motor Truck Tour Boosts Sales

N spite of adverse weather conditions on part of the trip, the central Ohio motor truck development tour staged by the Columbus Automobile Trade Association the week of April 19th-24th was a great success and the dealers who participated returned to the city at the end of the trip thoroughly satisfied that the tour did more to boost truck sales in the agricultural districts of central Ohio than anything that has ever been done in that direction. Eighteen motor trucks participated, under the direction of C. S. Magruder, manager of the Columbus association, who acted as tourmaster. A. R. Kroh, farm motorization expert, accompanied the caravan as speaker, and addressed large gatherings of farmers and others wherever the trucks stopped. Many unusually large gatherings had been arranged and Mr. Kroh's message, to help the farmer to greater production through complete motorization of his farm, was heard by thousands during the week.

One of the greatest farm-hauling demonstrations of the entire week was the first one staged, during the noon stop at Circleville. About sixty farmers had gathered in the rain at Circleville to see what the trucks could do, and the local committee had planned a demonstration well calculated to test the stamina of the new transportation unit. The farmers were loaded onto several of the trucks and carried to a farm near town, where the farmer had been engaged in hauling fodder for his cattle from a river-bottom field nearby. This field, low down, of the softest and slipperiest kind of rich, black loam, was practically bottomless from the heavy rains of the preceding month, in fact the farmer admitted he could not haul fodder from the field with a team and wagon because of the conditions.

The Winther truck was loaded with skeptical farmers, and, under the direction of Mr. Kroh, was driven to a point about half a mile from the main road, across the soft field. Driving from shock to shock a full load was taken on, and then, with eight or ten farmers piled on in addition, the truck was headed for the main road again. In spite of almost impossible conditions, the truck rolled on and out of the field, to be greeted with a cheer from the now thoroughly convinced farmers who had remained on the road, waiting to see the truck get stuck in the field. There was no argument left for the farmers, and they were so thoroughly convinced of what a motor truck can do under the most adverse conditions that many signified their intention of investing this spring. If the truck could do the impossible in what was admitted to be one of the worst spots in Pickaway county, the farmers were quite satisfied of what it could do under more favorable conditions.

All along the route the trucks performed demonstration work, and not only convinced the farmers of what they might expect from trucks on their farms, but also convinced the dealers that they were selling a product for which no excuse need ever be offered in the future.

The route, covering over 300 miles, was through the following towns: Columbus, Circleville, Lancaster, Somerset, Zanesville, Newark, Mt. Vernon, Mt. Gilead, Delaware, Marysville, London, Washington Court House and Mt. Sterling.

The following trucks participated. Ace, Armleder, Brockway, Day Elder, Dorris, Federal, Ford, Gary, Huffman, International, Maxwell, Nash, Oldsmobile, Republic, Service, Tiffin, Vim and Winther.

Interest was added to the tour by the presence of the Service motor truck that went through the national motor truck tour last fall. This veteran truck was driven through the Columbus tour by its same driver, Paul Mudget, and attracted considerable attention.



The Ace Truck Carried the Band



C. S. Magruder

Manager of the Columbus Automobile Trade Asso., who acted
as tourmaster.



A. B. Coates
Columbus' oldest motor truck
dealer, who entered a Federal
in the tour.



Y. B. Jones
President Columbus Automobile
Trade Asso., and Republic truck
dealer at Columbus.



Two Truck Tour Veterans Who Were in the Ohio Tour

Paul Mudget, who took the Service truck through the National Tour, and A. R. Kroh, farm motorization expert, who has been the principal speaker on many big tours.





The Winther Truck in the River Bottoms Loading Fodder. Farmers Were Loaded in the Trucks and Taken to the Demonstrations

# What's the Best Way of Selling the Farmer?

The Dealer Who is Putting Them Over is Also Giving Service.
It Means Rolling Up Your Sleeves and Pitching in

By JAMES W. COTTRELL

ISTRIBUTORS and large city, dealers realize the importance of working the country sections in their territories, but, it is not easy to design and carry out a workable plan to solicit business from farmers. Whether to send out men from the central office or to appoint numerous dealers and subagents in the various towns must be decided.

Irrespective, however of the form of organization which the dealer employs to reach the farmers, certain things and methods are essential for continued success. The views of dealers who have built up trade among farmers who have bought trucks should be of value. And some of these views and experiences are here given.

Consider the matter from the farmer's viewpoint. Will he buy your truck? Or what can you do to induce him to buy your truck? One man not without experience in the selling of trucks and machinery to farmers gave his answer, "If he knows that he needs a truck and you are the right kind of a dealer and you approach him in the right way at the right time, with the right kind of a truck (or product) you can get the order."

There is a world of meaning and sound advice in that statement which may be missed by the very simplicity of it.

## If He Knows That He Needs a Truck

The farmer may need a truck and not fully realize that fact. Advertising keeps the matter constantly before him. Local advertising and circular letters and many other advertising means bring the idea close to the farmer. But in many, many cases the actual realization of his need of a truck comes to a farmer from seeing

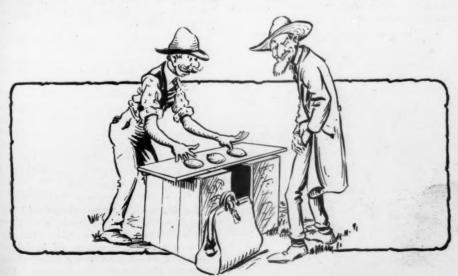
a truck used by neighbors or other farmers in his section. He may be a market gardener selling produce in a nearby city. He, or one of his sons, drives the team in during the night. It is a long and trying trip for both driver and team. Next door there is a truck. It leaves for market an hour or more later than the team and passes the latter on the way. Rid of its load the truck is back home by the time the team is leaving the city on the return trip.

Day after day the same thing happens and unconsciously the farmer is being sold on motor transportation. Or a teamsters' strike may tie up shipments by freight and result in a freight embargo. Trucks are then called in to carry produce from the farm to the city market. The value of the truck to meet emergencies is again demonstrated.

Such a strike in one of our large cities resulted in the sale of several trucks to farmers in the supply area for the city. They had been shipping by freight and hauling to the stations by teams. Now they have trucks and if there is any tie-up in freight movements the trucks are run direct from the farm to the city.

Farmers who are getting ahead, and they are the ones who can and will buy trucks, are keen, level-headed business managers of their farms. They have no time or money to waste on frills but they are on the lookout for any improvements and helps in their task of raising food—for the rest of us.

Many successful dealers and salesmen have difficulty in selling trucks to farmers and think the field too low in percentage of results to bother with it. At the same time another dealer in the same territory sells a great many trucks.



This Type of Farmer is a Rare Bird These Days



## Are You the Right Kind of a Dealer?

What is the right kind of dealer? Farmers, who have been asked to give their ideas, say the right kind of a dealer is one who is capable, honest and on the job at all times. The personal element, confidence in each other, are factors of importance in dealing with farmers. I know of several cases where verbal orders have been given by farmers for trucks with special and made-to-order bodies and not even a deposit given on the orders. When the trucks were ready and delivered they were paid for without question. Such cases are exceptional and the method cannot be used generally. But the mutual confidence which entered into these deals is something which all should envy.

More and better service is required by farmers than most other truck users. During the winter season the farmer has time to have his truck repaired and put in good order throughout. During the busy season it must be kept going every day. The slightest trouble may mean a very serious loss.

On a trip to market with perishable produce a breakdown may cause a loss of the whole value of the load.

So, when a farmer calls up a dealer for repairs he literally wants him to "drop everything and run" to his assistance.

Farmers are apt to take a keen interest in the stock of repair parts carried by a dealer and his facilities for repair work. And the dealers general reputation for promptness is caring for emergency calls will be considered. In fact, this one factor often swings a sale. It is not necessary for the dealer to have the largest shop in town. Satisfactory service can be given by a small place if the management is on the job.

For illustration: A farmer called a dealer on the phone and asked that a man be sent out to look at a truck engine which could not be started. It was then 6.30 P. M. and the owner wanted the engine looked at right away as he wanted to use the truck early the next morning and had to arrange to have men to load and unload it. He was told that it was after closing time and a man could not be sent until after 8 o'clock the next morning.

Another dealer, who was dressed up and on the way to a party met one of his customers with his truck laid up on the side of the road. It took but a moment to find out that the gasoline line was clogged up. Spreading a newspaper on the ground the dealer got under the car, took the gas line off and cleaned it and within fifteen minutes the truck was running again.

The job didn't help the appearance of the dealer's clothes any, but—if these two dealers went to sell a truck to a farmer which one would get the order?

## Approach Him in the Right Way at the Right Time

All of the art of true salesmanship is neded in selling trucks to farmers. A city customer or business house considers the purchase of a truck as a cold-blooded business proposition. An investment of a certain amount of money is or is not justified by the results obtained.

But to many farmers the purchase of a truck is an event which must be planned and worked for, a long time ahead. Although the dealer may never find it out the truck may be competing with alterations in the home, plumbing, electric light plant, or more stock or any one of the many things in which the farmer can put his money to work.

The caricature of the farmer in the comic papers does him an injustice, and misinforms the reader, who, from such a source, gets his impression of the characteristics of our real producers.

The farmer is a careful buyer and will ask many questions about a truck before even considering it for purchase. A salesman who is telling all about "the Conwest motor, Russken rear and Timatt bearings" may be brought to an abrupt halt by the questions, "How many baskets of potatoes can you carry inside the body?"

A farmer is interested in a truck to the extent to which he can use it on his farm work.

The live country dealer finds out all he can about a farmer before going to see him. The size of his farm, stock kept, crops raised and where and how they are sold are all looked up. Then the dealer makes his sales arguments strike home.

"With my truck you can load 150 baskets and drive to market in one hour and a quarter. Let's load up the truck outside and try it." That sort of argument sinks in.

Or, if the farmer ships perishables to a distant market by freight the dealer will show that "You can keep on picking and packing an hour later every day and still he the last load at the station before cosing time, if you use a truck."

A demonstration of hauling the farmer's own goods right on the farm is the best way of showing him the value of motor transportation. Such demonstrations were made at almost every stop on the truck tours last summer and the interest of the farmers left no doubt as to their value.

Demonstrations should be made with trucks with complete equipment including bodies. Of two trucks offered to a farmer he is quite likely to choose the one having the body best suited to his needs.

One sale of a truck was delayed for weeks because the trucks offered did not have headlights. The farmer expected to run the truck to market at night and the oil side lights given as standard equipment did not satisfy him. When one dealer gave a price including the installa-

tion of electric headlights the deal was closed at once.

## Even the Question of Appearance Must be Considered

The methods of salesmanship are varied and many. I know of one very successful salesman who spends part of his time in a city sales room and the rest of the time



This Type of a Salesman Will Not Get a Favorable Reception

in the country. He wears different clothes in the country than in the city. Not old clothes, but when in the country he wears a plain dark suit, substantial high shoes and a cap. He is dressed well, but not showily. If he has to walk across a muddy field to see a farmer he does it without thinking that one spot of mud will ruin his clothes which would be the case if he were all dolled up.

A farmer does not object to good clothes; he wears them himself when he has the time. But if a dealer sends out salesmen looking like Fifth Ave. fashion plates the farmer cannot help wondering who in the outfit is to give the "service" which he must have and which is so freely promised by a man who by his attire shows that he could not give it.

## The Farmer's Busy Time

Farms have their peak loads of work as do other lines of work. There are times when a farmer is too busy to be civil to callers. But as a farmer usually thinks over the buying of a truck and quietly looks around for months before buying, the advance work should be kept up at all times. Circulars, local ads all help to carry the argument at times of visits.



The Farmer is a Hard One to Land

The decision usually comes from a farmer quickly when it is made. He will do nothing until he is ready and then decide at once.

Several dealers were trying to sell a truck to one farmer. Five of them called regularly and as time went on the landing of that order became a game of beat the other fellow on a hard job. The farmer listened to all of the arguments and rode in all of the trucks but gave no particular encouragement to any one. The affair kept up for several months and the dealers had exhausted every means to get the order and had about given it up.

One day one of the dealers got a message from the prospect asking the dealer to call "the next time he was going by." The dealer "happened" to be going by within an hour as soon as he saw the prospect was told "If you can deliver that truck next week I'll take it for cash. (At time payment deal had been mentioned.)" The dealer was surprised and could not account for the decision. Later he found out that the farmer had gone to see owners of each of the five trucks offered and had bought the one which was unanimously praised by owners.

## Farmer Demands Quality

There can be no doubt that farmers are more and more looking for quality in trucks. Thinking at first only of the speed of motor transportation the farmers bought small and cheap cars, sometimes secondhand ones. "The cheaper the better" was the motto. But breakdowns at critical times and heavy repair bills at all times soon showed that the equipment was not equal to the task imposed upon it.

A truck of about one and one-half tons capacity seems best adapted to all-around work on the farm. It is light enough to be fast, nimble, quick and easy to handle and its capacity is right for most of the work about the farm and for hauling produce to market. There are times, such as when fertilizer is to be hauled in the spring that a larger truck could be used but this is only an exception in the year's work.

Pneumatic tires are of peculiar interest to the farmer. It is often desirable to load a truck right in the field. The pneumatics give better traction and allow the truck to carry loads in sandy and soft ground. The better riding qualities of pneumatic-tired trucks appeal to market gardeners handling perishable crops in baskets. The higher speed possible on pneumatics is also of importance to the farmer.

Reliability is THE quality in a truck which interests a farmer and he is learning that only good well-built trucks can give him this quality. The large number of high-quality trucks being sold to farmers shows that performance first and price second is becoming more and more the viewpoint of the farmer.

The Motor Transport Corps will discharge about 3000 men in the next three months. Particulars regarding the experience and qualifications of individual men wil' be furnished by the office of the Chief of the Corps, Washington. The men were trained in the M. T. School.

# Trailers Double Motor Truck Efficiency

Protect Truck Chassis From Strains Due to Overloading. Reduce Cost of Haulage Fifty Per Cent. Wide Range of Applications. Growing Importance of Trailer Industry in the Automotive Field



Train of Six Detroit Trailers Making Turn, Showing How Trailers Track With the Towing Truck

## By DONALD McLEOD LAY

RASED on the principle that a motor vehicle, like a steam locomotive, can pull much more than it can carry, the trailer has come to be recognized as an important adjunct of the motor truck in efficient, economical transportation over the highways.

The origin of the trailer was the use of ordinary horse-drawn wagons towed behind threshing machine outfits drawn by traction engines. Towed wagons in road construction work led to the development of special road tractors of both the gasoline-driven and electric types. It was approximately a dozen years ago that one of the pioneer motor truck manufacturers produced a three-wheel gasoline road tractor for use with wagons of the horsedrawn variety, the front wheels and axle of the wagon being removed and the front end being supported on the rear of the tractor. Flexibility for turning was provided by a fifth wheel arrangement. Not long after this a concern building

front-wheel-drive and four-wheel-drive electric trucks came out with a fourwheel tractor and also a two-wheel frontdrive mechanism for tractor purposes.

## Ordinary Wagons Unsuitable

Wagons of the horse-drawn type could not withstand the speed attained by the tractor. Their iron tires caused them to bounce and rattle over the roads and it was not long before the effects of this wear and tear became so marked that heavy repairs were necessary at frequent intervals. In spite of the care and money spent in keeping the wagons in condition, however, it became apparent that they could not perform their work efficiently under conditions for which they were not designed or built.

With the conclusion that speciallybuilt trailers, capable of withstanding the severe conditions imposed by higher road speeds, would prove valuable auxiliary vehicles to be used in connection with road tractors, motor trucks and automobiles, came the decision of a well known wagon manufacturers to profit by the experience of the automobile industry. Accordingly, automobile engineering principles were applied to the problem and the result was a line of real trailers for motor trucks, incorporating steel frames, artillery type wheels, rubber tires and steering-knuckle axles fitted with roller bearings. The success which greeted these new vehicles inspired a number of other long-established wagon and carriage companies to develop various types of trailers to meet the growing demand and to take up the slack in their business caused by the decline of the horse-drawn vehicles.

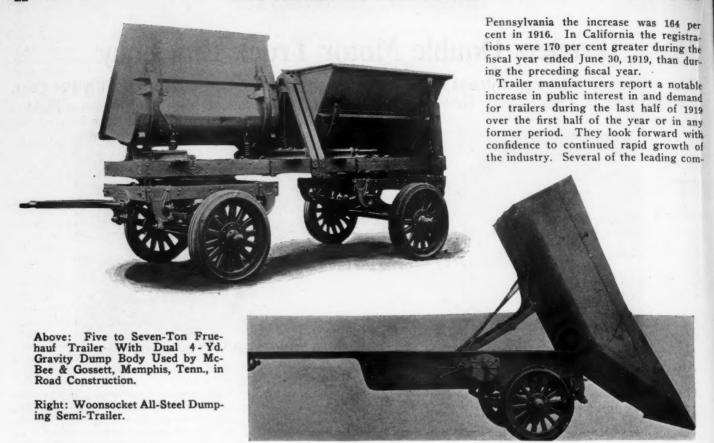
Based largely on the automobile and motor truck industries, and utilizing as it does the general principles, material, stock, dimensions and other standards perfected by them, the trailer business has shown a rapid and healthy growth.

As an industry, the manufacture of



Two and a Half Ton Highway Trailers in Use by the Milwaukee Electric Railway & Light Co., Milwaukee, Wis.

The trailers are being pulled by 2-ton trucks. The Milwaukee Electric Railway & Light Company employ a fleet of Highway Trailers and use them as feeders for their interurban lines. The trailers operate between Milwaukee, Whitewater and Ft. Atkinson, Wis.



trailers dates back only half a dozen years but it has grown rapidly until today there are seventy-five or more trailer manufacturers in the country, of whom about two dozen are doing a national business and several are exporting to foreign countries. The others have a local or sectional trade but some are reaching out into wider territory. Before the outbreak of the war the trailer was scarcely known and commanded no attention, but during 1917 and 1918 the War Department purchased 30,000 trailers and shipped 5500 to the American Expeditionary Force in France. Large numbers of these were kitchen trailers or portable kitchens; others were built and used for hauling ordnance, searchlights, airplanes, blimps, etc., and still others were movable repair shops.

Use of trailers and semi-trailers by the Army in this country and by the U. S. Spruce Production Corp. in the Washington and Oregon forests for getting out spruce logs for aircraft manufacture afforded examples in efficient and economical haulage that stimulated public interest in trailers and led to their adoption by many private enterprises.

## Use of Trailers Doubling Yearly

The purchase and use of trailers have more than doubled annually during the last three years, as indicated by registrations in the several states that require trailers to be registered separately from motor cars and trucks. In New York the number of trailers registered in 1918 was 125 per cent greater than in 1917, and in New Jersey it was 82 per cent greater. In

panies have erected new factories and largely increased their production facilities, while a few new companies have entered the field during the past year.

With the formation of the Trailer Manufacturers' Association of America in March, 1919, and the establishment of national headquarters in New York in May, the industry quickly took its place as an important factor in the automotive field. Close co-operation in matters affecting the manufacture, sale and use of trailers in conjunction with motor vehicles in transportation by highway has been established by the association with the National Automobile Chamber of Commerce, the Motor & Accessory Manufacturers' Association, the Rubber Association of America, the National Automobile Dealers' Association, the American Automobile Association, the Federal Highway Council and the Society of Automotive Engineers.

Trailers are now made in a wide variety of types and capacities for all sorts of purposes, ranging from the little pneumatic-tired. two-wheel trailer of 500 lb. capacity to be attached behind runabouts and touring cars, to ten-ton and fifteen-ton trailers and semi-trailers hauled by powerful tractors and motor trucks. A few specially-built trailers capable of carrying loads of forty to fifty tons are in use. Nearly every manufacturer of heavy trailers makes a line of pole and pile trailers for handling telephone poles, timbers, pipe, rods, structural beams, etc., ranging from fifteen or twenty feet to sixty five feet or more in length. There are also special dumping trailers for lumber, coal, road materials and so forth, and several companies furnish tourist camping



Truck and Trailer Fitted With Special Bodies for Hauling a Combined Load of About 300 Empty Barrels

By doubling the load this trailer cuts the cost of haulage nearly in half

(Continued on page 90)

# Fay Company Proves that Motor Bus Lines May be Run With Profit in Opposition to Street Cars

Company Successfully Operates Big Fleet of Buses at Rockford, Ill., in Direct Competition With Street Cars at Slightly Higher Fare. Drivers Get Their Commission Daily

By A. V. COMINGS

HAT a motor bus line may be successfully run in competition with a street car system, at a higher rate of fare, and that such excellent service may be given that citizens generally may look with considerable favor on the ultimate substitution of motor buses for the present inadequate street car facilities, is being proved every day in Rockford, Illinois. In this live upto-date manufacturing city of over 75,000 people the Fay Motor Bus Company has given a big community an entirely new idea of what motor bus service may really achieve, in the way of quick service, reliability, responsibility, and intelligent and business-like handling of the transportation problem.

So successful has the Fay company been in proving to Rockfordites that motor buses are real, thoroughly dependable transportation units, that the city is actually considering at this time of granting the bus company a franchise to handle all urban transportation as soon as the present electric railway franchise exnires.

## Jitneys Flourish During War Time

The beginning of this country's participation in the world war found Rockford, like many other cities, struggling along with a street car system overburdened with mounting operating costs and unable to adequately handle its peak loads, and, with equipment and track

badly in need of replenishment and repair. Then Camp Grant was located near the city, and that placed a tremendous additional burden on the street car system. Wild cat "jitney" buses flocked to the city, and cut deeply into the street car's revenue, at the same time maintaining the usual irresponsible and irritating

A separate story covering costs of operation and other data incident to the proper and successful methods of carrying on a motor bus system will appear in a subsequent issue.

service, which always characterizes this method of transportation where the cars are run and owned by individuals, intent on getting the money while the getting is good.

With the virtual closing of the camp except for its garrison of a few thousand regulars, these irresponsibles gradually faded out of the picture, and on the fifteenth of last September Rockfordites saw the first six motor buses of a fleet they were soon to know very well, placed in service by the Fay Motor Bus Co. This small fleet consisted of four Reo speed wagons and two Dodge commer-

cial cars, fitted with passenger bodies with an average capacity of seventeen persons. They had been used by the Fay company in handling soldiers between Chillicothe, Ohio, and Camp Sherman, and with the closing of that camp Mr. Fay moved his fleet to Rockford.

## Organization Grows Rapidly

From that time until the present writing, the fleet has been added to frequently, and today 23 buses are in operation, running on regular routes and schedules in Rockford, and between Rockford and Camp Grant. These are principally Reo speed wagons, fitted with comfortable, though inexpensive, passenger bodies with seats arranged lengthwise, and capacity for eighteen passengers. Before putting these cars in service, an extra leaf is added to each rear spring, and a size larger tire replaces the standard rear tire equipment.

Through the early weeks of the fleet operation the company lost money consistently, but T. J. Fay, the owner of the company, had absolute faith that the motor bus idea was fundamentally right. and that his losses were due to his own inexperiences and mistakes in handling the business. One by one he corrected the errors, till the turning point was reached, and today the company shows a steady, consistently growing profit, and not one cent of outside money was required to mend the mistakes and put the company on a paying basis. Mr. Fay brought good, sound, analytical business sense to bear on every problem, made changes where necessary, and today the Fay buses run through Rockford like clockwork, giving the city a service it had never dreamed possible, and returning to the Fay company a good dividend on its investment.

In commenting on the things that are necessary to success in operating a bus line, Mr. Fay says: "Care and experience must be exercised and used in the selection of the type and size of chassis and body. One must have a large enough organization to handle the checking and dispatching, proper garage facilities, a good repair shop, and incentives for the drivers to care for their buses. It is a big business and must, to be successful, be handled by a large organization."

## Three Regular Routes are Maintained

Three routes are in continuous operation by the Fay Company, to Camp Grant, thirteen miles round trip; to Love Park. seven miles round trip, and between Central Park and Harrison and Eleventh. In addition to these routes, covered by



One of the Fay Motor Buses; Note Parcel Compartment Overhead

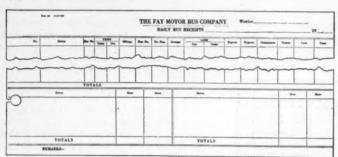
twelve buses during the day, there are regular peak load routes handling factory workers mostly, direct from their home districts to the factories in the morning, and returning at night. And these workers, through the operation of the buses, have almost two hours' more time at home daily than they had when they depended on street cars, and at only six cents additional expense, for the bus fare is ten cents each way as against the street car's seven cent fare.

On the Camp Grant line, the thirteen mile round trip, each bus makes the round

the thermometer registering twenty-one degrees below zero, the street car system was confronted with the usual setbacks street cars usually get into under such circumstances, while the Fay buses maintained their regular schedules. And a line Mr. Fay was operating to Rochelle, 35 miles away, on a two-hour and fifteenminute schedule, with five town stops, was maintained regularly.

As to fares, on the city lines the price is ten cents per passenger. On the Camp Grant line the fare is twenty cents, single Now as to methods of handling the business end of the bus line. The driver, being the point of contact between the Fay company and the public, is very carefully selected. He must fill out a very searching application blank, which calls for the enumeration of most of his past history as an employe, and must give three good references, which are looked up very carefully.

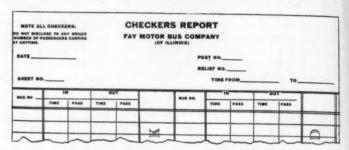
When he is put on the pay roll he is given one of the oldest buses as his first assignment, and to all intents and purposes that bus becomes his property, to



Loose-Leaf Form for Listing All Essential Items Aids in Business Comparisons

| TOditor.                 |                 | Office   |                      |                   |                |
|--------------------------|-----------------|--|----------------------|-------------------|----------------|
| Ne. of Tickets<br>Wanted | Form            | Description or Style                               | Commencing<br>Number | Closing<br>Number | Number on Hand |
| Note.—R                  | stain a copy of | f your regulation.<br>ck on the 18th of each moost | and order 15 days in | advance of view   |                |

Requisition Blank to be Filled in by Drivers Requiring a New Supply of Tickets



Time and Passenger Checking Form

| Form 104<br>3-1-903000      |            | THE     | FAY | MOTOR<br>TIRE RE |          | COMI  | PANY    |         |
|-----------------------------|------------|---------|-----|------------------|----------|-------|---------|---------|
| TIRE                        | NUMBER     |         |     |                  |          | Date. |         |         |
| Purchased from              | n          |         |     |                  | Made by_ |       |         |         |
| Order Ne<br>Specification N | 0          | Req. No |     | Stock            |          |       |         |         |
| Date<br>Installed           | Car<br>No. | Size    |     | Date<br>Removed  | Ca       | U80   | Mileage | Remarks |

Tire Record Takes in Every Detail

| DATE |       | Ь   | PAY MOTOR BUS |          |      |      |     |
|------|-------|-----|---------------|----------|------|------|-----|
| BHEE |       |     |               |          |      |      |     |
| BHEE | T NO. | 713 | PERCTION      | TIME OUT | CASH | TICE | RYS |

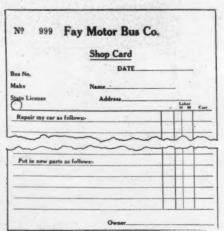
Dispatched Cars Are Registered on This Card

trip in one hour, generally with about ten minutes to spare. The operating time to the end of the street car line at Camp Grant is twenty minutes by bus, forty-five minutes by car. These buses wind their way through Rockford streets in making this schedule at a very safe and apparently slow speed, and in the outlying districts the speedy, quiet buses are a wonderful contrast to the roaring, rattling, jolting street cars, which often hammer their way along at top speed with one or more flat wheels making life miserable alike for passenger and residents along the rail route.

The statement is often made by those hostile to motor bus operation that they are unsafe, that passengers are more often injured in them than in street cars. Well, Mr. Fay has carried over two milhon passengers in his various motor bus lines, without serious injury to a single passenger. That rather refutes that argument.

As to cold weather operation, when Rockford was struggling with snow with

ticket. If six tickets are purchased for one dollar, the fare becomes 16 2-3 cents per ride. And for \$7.20 forty-eight tickets may be purchased, making each trip 15 cents.



Every New Part Entering in a Repaired Bus is Issued Only on Requisition

look after as carefully as though it belongs to him. He must keep it clean, must report all mechanical defects as soon as they appear, must conserve the tires, and above all must be courteous and obliging to patrons. Upon his attention to all these details rests his promotion to newer and finer buses on the line, on more favorable routes. The result is that the drivers strive to merit promotion and are thoroughly efficient as a rule.

## Profit Sharing System of Wage Established

The drivers are paid 20 per cent of all they take in, this method of paying them having been decided upon after trying out several plans, none of which worked out as well. The driver deducts his share from each day's receipts before turning them in. This puts it squarely up to the driver to use all his devices to give good service and cultivate the public, so that he will carry more passengers with every

(Continued on page 88)

# Is There Money in Handling Motor Truck Equipment?

Here's an Article Which Shows That Many Dealers Are Missing a Good Opportunity by Not Paying More Attention to Equipment Sales

By C. P. SHATTUCK

HY is it, Mr. Dealer, that in your city one of your competitors gets the cream of the sales on chassis sold to industries employing the dump type of body and, of course, hoist equipment? And how is it that another competitor practically monopolizes the sales made to telephone, electric light, safe moving and other companies specializing in handling heavy material, and which require the use of a winch or other hoisting, loading and unloading equipment?

You are skeptical. You say it is not so. It may be an exception in your city but the rule will apply in the majority of cases. An analysis of the coal industry, for example, in one large city, revealed the fact that one well-known make of truck practically dominates this field. In the same city another make has the edge on all others in supplying the telephone and electric light companies. And still another make predominates in the safe-and piano-moving industry business.

### Why They Are Successful

Why do these conditions exist? Simply because the sales departments of these dealers include salesmen or sales-engineers who are familiar with the requirements of these particular fields. When one of these experts meets the buyer or engineer of a telephone company, a contractor, a coal dealer or electric lighting company, the salesmen and prospect meet on an equal footing insofar as practical and engineering knowledge are concerned. The companies monopolizing these fields; that is, the salesmen, are not selling trucks but the work the equipment will do. And these equipment experts can reel off facts and figures and back them up with concrete cases of the equipment and trucks in service. And being able to refer to a

list of prominent concerns using the equipment is a big factor in breaking down the barriers of sales resistance.

## Can't Afford Experts, Says Dealers

"Why I know all this," said a dealer with whom the writer discussed the subject. "It's old stuff. It is true that the companies mentioned do get the cream of the business but they can afford to train and pay for such talent. The average dealer cannot maintain a specialist for the various lines. And they are not easy to get and still a darned

sight harder to keep after you get one. Oh, yes, I know some of the larger and more successful dealers are using equipment engineers for instructing their salesmen as to what is the proper equipment and proper body for that matter, but again I remark, what are we small dealers to do?"



E. A. Brayshaw
Who is doing what a great many dealers say,
can't be done

I told him I would bear in mind the small-dealer angle while investigating how equipment was sold and dropped off in New York City to begin the search. After calling on several dealers and ask-

ing them how they sold truck equipment, hoists, winches, bodies, etc., the same answer was received, i.e., they "passed the buck" to another company, the Interboro Hoist & Body Corp., and at the same time secured a good profit. So after many changes in subways and elevated trains, essential to reach Brooklyn, I located the Interboro Hoist & Body concern and its president and general manager, E. A. Brayshaw. And he is a busy man.

## Affords Wonderful Opportunities

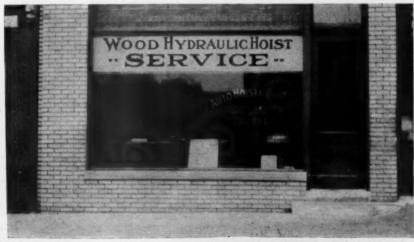
And to him I repeated my discussion with the dealer and asked if he had a solution of the problem. Mr. Brayshaw had, and boiled down, it is as follows: A year ago he was connected with an industry disliked by the advocates of the 18th amendment, and having been attracted to the truck industry because of its wonderful growth and posibilities, he made an intensive study of motor highway transportation. As a result of his investigations he came to the conclusion that very few motor truck dealers realize the close relation that the equipment industry has to the motor truck. Because of the capital required to stock hoists, winches, cranes, etc., in all sizes and styles, Mr. Brayshaw says it has been impractical for the distributor or dealer to do this where they are only selling for their own chassis.

Further investigation resulted in disclosing the fact that with the large number of chassis being sold in the metropolitan district, as well as in other sections of the country, that the dealers, particularly the small dealer, was sorely in need of a concern that had sufficient capital to stock hoists, winches, cranes, bodies and equipment to meet any requirement. And further there was need of a company with a practical service policy, one capable of repairing winches, hoists, cranes and

bodies on short notice, and being able to make 24-hour or better delivery

## Solving the Small-Dealer Problem

So the company was organized with sufficient capital to carry out its plans and became metropolitan distributors and service station for the Wood hydraulic hoists and steel bodies manufactured by the Hydraulic Hoist Manufacturing Company, at St. Paul; the Simplex, Four Bodies in One, made by the Simplex Manufacturing Company, Conneautville.



The Office of the Interboro Hoist & Body Co., Formerly the Auto Hoist & Body Co.

A new factory and service station is now being built in Long Island

Penn., and Mead-Morrison winches, produced by the Mead-Morrison Manufactur-

ing Company, Boston.

The next step was to formulate a service policy. Mr. Brayshaw says he has tried without success to find a substitute for the word "service" as the same has been abused by the automotive industry, but after the expenditure of much grey matter was obliged to employ it. The interpretation of service, and which is lived up to, is as follows:

To always carry in stock, as near as possible, complete equipment for motor trucks so that deliveries can be made at short notice.

To install this equipment on motor trucks in the least possible time.

To sell this equipment at a price that will be of mutual advantage.

To co-operate with the trade in any way that will help advance the automotive industry.

The dealers who cannot afford the engineer-salesman referred to early in this article, supplies his salesmen, the ordinary seller of chassis, with a lead—a concern requiring a winch, for example. Instead of the salesman attempting to talk winches advises his prospect that his company has an arrangement with a winch specialist, engineers, who will go over the subject in detail. The salesman then proceeds to establish a contact between the prospect and the Interboro company, generally by making an appointment and carrying the prospect in a passenger car.

### Saves Salesman's Time

The engineer of the Interboro company goes over the plans with the prospect, and advises him as to the proper capacity, installation, etc., and, incidentally, the prospect is impressed with the facilities of the company, its stock of equipment, service, etc. The salesman now proceeds to secure the order. The chassis is sent over to the Interboro plant and in 24 hours or less the winch is installed and delivered to the customer. If through abuse or accident the winch needs attention, service procedure holds good for a hoist, and the work is done by mechanics who can turn out work as it should be done, at a minimum cost to the owner, and much faster than the dealer's mechanics could do it.

The dealer is given a discount from the list price and in addition expends less money for installation of a hoist than he would if he attempted to install it in his own shop. Figures shown the writer revealed an average saving of \$15 per hoist and a still greater saving in time. The dealer is also relieved of the responsibility of the installation and of servicing the equipment. The Interboro Company does not sell at retail, dealing only with the trade.

## Salesmen Not Familiar With Equipment

Mr. Brayshaw says it is surprising the number of salesmen he comes in contact with, and those whom he has observed making truck sales, who are not familiar with truck equipment. He is conducting an educational campaign by attending sales meetings and addressing the salesmen. As he says, "We are endeavoring to educate them to merchandising truck

equipment; want to aid them in making sales and to get the equipped chassis into the hands of the user in the quickest possible time. For a number of years it has been the custom among truck dealers to have bodies built after the chassis is sold, and in this way the dealer ties up a lot of capital on account of the chassis being at the body builders waiting for them to complete the outfit so that the dealer could turn it over to his customer.

"If the truck manufacturer and the dealer would give the truck equipment the attention they should, it would reduce a great deal of sales resistance, as I know salesmen have said to us that the buyer of motor trucks gets fed up on truck chassis after they have talked to six or seven salesmen and that they have closed their deals by forgetting about their chassis after explaining the general merits, and talked equipment, as this is a non-exhaustable subject."

The Interboro company does not maintain a corps of salesmen. They have but one, the sales engineer, who remains at the plant. "My salesmen?" said Mr. Brayshaw, in reply to a question of a manufacturer who was present at the time, "why they are the hundreds of dealers in the territory I cover." It comprises a radius of about 75 miles and includes part of Connecticut and New Jersey. Chassis are driven to Brooklyn from Hartford and other Connecticut cities, and whenever essential the hoist is installed in half a day. If necessary the mechanics work overtime to deliver special orders and to maintain the schedule of delivery.

## How Proper Equipment is Sold

The Interboro Company sells and installs bodies and has developed a number of special designs including combination bodies. It issues a catalogue to the trade

but no prices are given therein. Mr. Brayshaw believes the policy of having a company like his supply a body, advise the customer as to the proper type makes satisfied customers for the dealer. By being neutral, to a certain extent, the Interboro Company can show a customer why he should not insist on a body with a long overhang when carrying dense and heavy loads, why without proper sub sills, or not caring for proper distribution of the load that trouble will result. These and numerous other details with which the average truck salesman is not familiar can be explained to a prospect by the Interboro expert and the prospect generally is convinced.

## What Will You Do?

After reading all of this, Mr. Dealer, you may remark that it is all very nice for the truck dealers in the Interboro district but how is it going to help those dealers not convenient to such an establishment? It is and it isn't. It won't if the dealer or a group of dealers cannot read between the lines and see the wonderful opportunities suggested by this And it will if a dealer with capital, or several dealers who can pool capital, organize a company along the lines of the Interboro. Oh, yes, this company is making real money. They are averaging about 40 hoists, cranes, winches and bodies a week and could sell lots more could they obtain them. And those dealers who cannot make headway in selling against their competitors in the industries early mentioned in this article may find a solution to their problems by some similar plan. At least the writer hopes the dealer who said that it was "old stuff" will find food for thought in the suggestion.

# Efficient Loading Facilities Necessary With Dump Bodies

Unless Motor Truck is Loaded in Quick Time the Saving
That Comes From Using Mechanical
Hoists is Lost Each Trip

By A. V. COMINGS

T is now fairly well understood among motor truck dealers that the successful salesman is the one who can go to a prospect and show him where he can cut his haulage costs by using motor trucks. To be able to clearly demonstrate this to a prospect, the salesman must know costs on a wide variety of haulage propositions, and must constantly keep his eyes open to new methods of cutting down leading and unloading time, thereby making his outline of the earning ability of the motor truck as attractive as possible to the prospect when he gets the opportunity of presenting his analysis.

For instance, a coal dealer may have loading facilities for keeping but four motor trucks constantly on the move delivering coal. A truck salesman, perhaps, has been put off with the statement that until the yard has better loading facilities he cannot hope to sell another truck. It is then up to him to put his wits to work and either out of his own planning or through knowledge gained from a search among his trade journals or around other yards with similar problems, to discover a plan whereby Mr. Coal Dealer can, at no great outlay, get the additional facilities that will mean another truck sale.

## Plenty of Opportunities to Create Sales

The opportunities for cutting down loading and unloading costs are so great that dealers and their salesmen should neglect no opportunity to add to their

knowledge of these factors in motor truck success, for every minute that can be shaved off the idle time of the investment of several thousand dollars, which is what a motor truck represents, means just that much better chance to sell more trucks in the future to that user.

Dump bodies, operated either by hand or power, have proved a great cost cutter in handling sand, coal, gravel and kindred materials, but they solve the problem at only one end of the trip, and if the truck must stand idle for a half hour or so while a load is being slowly shoveled aboard, it is not being operated at its most efficient gait. Not only is the one truck kept standing while loading, but usually others arrive while it is being loaded, with the result that several await their turns at being loaded. In these days when the hand labor necessary for such work is scarce and expensive, any plan for quick loading with a minimum of hand labor is doubly worth while.

The sand and coal companies bringing their products to Pittsburgh by river barges have worked out a good system for quick loading of motor trucks, whereby the trucks are idle only a minimum of time during loading.

#### Overhead Bins Save Much Time

The loaded barges are moored along-side a scow on which is a steam hoist, with long derrick boom from which depends a clam shell bucket. Formerly, trucks drove down to the levee, and the clam-shell bucket, swinging in great arcs from the barges to the truck, slowly loaded them where they stood. Later, however, a scow was built on which were mounted huge overhead bins, which could be loaded by the clam-shell bucket when the trucks were delivering sand and gravel. Now all the trucks have to do is to back under these bins, a slide is pulled, and the actual loading of the truck body takes less than a minute.

The levees is very steep at Pittsburgh, and to save wear and tear on these trucks electric hoists are placed at the street level, with a cable to fasten to the front axle of the loaded trucks. With the assistance of this steady pull, the trucks go up the steep levee with full load without strain to their machinery. As a man

is necessary at this point to weigh and check out the load, the only extra expense here is in the machinery.

Exact timing of trucks loading at this point showed that the average time from the moment the truck left the street level empty till it was back again, loaded and on its way, was slightly over six minutes. This is a great saving of time over the old method, where each truck was loaded separately by the steam hoist and clam-shell bucket.

A typical example of the amount of work being done by a truck under such loading conditions is seen in the work of a three and a half-ton Garford, which is being used in the fleet of the Iron City Sand Company at Pittsburgh. This truck, with three yards of wet gravel

ditions it is doubtful if the loading and and unloading consume over ten minutes.

The hydraulic hoist on this truck costs \$325 extra above the price of the truck. Two laborers, at eighty cents an hour, would take a half hour to unload this truck with shovels, where the hoist does it in two minutes. The saving per trip here on labor alone is eighty cents, and on an average day is \$12. One good-sized hauling job would pay for the hoist in labor saving alone, without counting the extra earning capacity of the truck through its ability to make more trips because of speeded-up unloading.

Even a hand-operated hoist, as used on a two and a half-ton Cylesdale truck working on this same job permits unloading by one man in five minutes, and,



Where Money Could be Saved

This \$3,000 dump truck was tied up for over half an hour while it was unloaded by hand.

Could have unloaded by dumping in one minute

loaded from one of these overhead bins, makes an average of from fifteen to eighteen trips per day, and has made, on short hauls, as high as twenty-five trips per day. It is fitted with a hydraulic hoist, so that unloading the truck consumes not over two minutes, as a rule. This shows but eight or ten minutes per trip devoted to loading and unloading under ideal conditions, and even under average con-

of course, the original investment in this type of hoist is much less than for the hydraulic type. The saving shown is so large, however, that it ought not to be difficult for the truck salesman to show the prospect the value of this type of equipment.

On a certain construction job in an eastern city bricks were hauled in a dump truck, and for a time were dumped in the usual way alongside the job. Later, however, to make it easier for the laborers on the job, the truck was stopped in such a way that with the use of a plank and a sawhorse the bricks could be wheeled directly from the truck into the building. The result was that this \$3000 truck was tied up over half an hour on each load, with the driver dozing on the seat, while two men with barrows, and two men in the truck body, unloaded the brick by hand.

All this may not appeal to the dealer who thinks his part of a truck sale is completed with the delivery of the truck. It has been my experience that the most successful truck dealers and salesmen today are the ones who take a real interest in their customers after the sale is made, and point out to them every possible way they can better the performance of their trucks. It is a good investment.



The Trucks Are Hauled to the Top of the Levee at Pittsburgh by Electric Hoist

This saves unnecessary wear and tear on the truck's machinery

# Horizontal Hydraulic Dumping Unit for Motor Trucks

HE horizontal hydraulic dumping unit, which includes both the hoist and dump body for mounting on any make chassis, and which will tilt the body to an angle of approximately forty-five degrees, is the product of the Horizontal Hydraulic Hoist Company, 456 Brooks Building, Detroit, Mich.

The power is transmitted either direct from a power take-off, through sliding gears installed in a casing attached to the transmission case, or from the front propeller shaft through sprockets and chains or from an extension from the transmission countershaft if the transmission is in unit with the engine of the truck. The

is controlled by a "control" lever which has three positions, namely, "raising," "holding" and "lowering." When it is moved into the "raising" position the oil passes under pressure into the hoist cylinder forcing the piston in the cylinder and in turn the cross head outward, which causing the lifting arm to start upward. When starting the body rollers are resting near the inner ends of the lifting arms above the point at which the lifting links are exerting the upward force, consequently the load starts rolling, the speed increasing as the side rollors move outward along the lifting arms and the tilting angle of the body is increased. When the extreme tilting angle of the body is reached, the hoist stops automatically and the lever is then shifted into the "central"

elevated position.

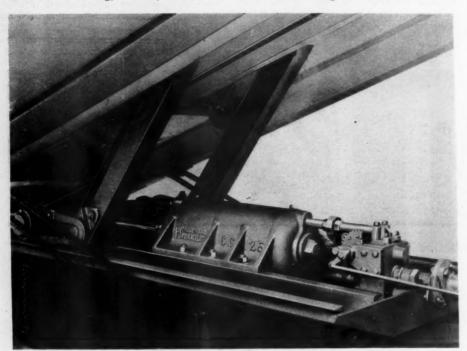
By operating the control lever the body can be raised or lowered while the pump is in operation, or can be stopped and held at any point while either raising or lowering. The pump drive is disengaged after the body has been titled to the desired angle. The body descends by gravity upon releasing the control lever to the "lower-

position which retains the body in an

ing" position.

The hoist assembly consists of the cylinder with pump and connection mounted on a structural steel frame with cross members for attaching to the chassis frame. The hoist assembly is positioned on the chassis frame from the center of the rear axle to the rear cross member of the hoist assembly, which is almost on a line with the rear shackle of the rear spring of the truck. It is attached to the chassis frame by bolting with one bolt in each of the four corners of the hoist frame.

The horizontal hoists are regularly furnished with the Horizontal Hydraulic Hoist Company's "all-purpose" dumping units, which are of steel and wood, and designed for contractor's service.



The Cylinder of the Hydraulic Hoist is Bedded Beneath and Out of the Way of the Body and Parallel to the Length of the Frame of the Chassis

The power of the lifting arms is exerted directly against the rollers on the underside of the body

The lifting mechanism of the horizontal hydraulic hoist is entirely underneath the body, which permits of the utilization of the full loading space on the chassis. It is so mounted on the chassis that it distributes the hoisting strains for a distance of five feet along the truck frame, directly over the rear springs and rear axle, and there is said to be no concentrated load on the truck frame while raising the body. The hoisting mechanism in no way interferes with the brake rods, etc., as it does not extend below the truck frame. For the same reason the ground clearance of the truck is not reduced. A smooth operating feature of this hoist is the fact that the lifting arms act directly against anti-friction rollers attached to the inner side of the body. This also makes unnecessary the use of wire ropes and rope clips, the breaking of which frequently causes considerable damage and expensive delay. Another important feature is the leverage arrangement, which maintains a practically constant pressure in the cylinder throughout the entire stroke. The lowest existing pressure is when the hoist begins to raise the body.

This hoist is operated by oil pumped at high pressure by a pump which receives its power from the truck engine. hoist-driving mechanism is only in motion when the hoist is in operation.

To bring the dumping unit into operation the regular truck engine clutch is disengaged and the pump drive is shifted into gear by the lever "clutch" in the control set. The operation of the hoist



Complete Assembly of the Model HH-1 Horizontal Hydraulic Steel Dumping Unit
Mounted on a Packard Chassis

# Columbian Hoists Adaptable to All Makes and Capacities of Trucks

HE Columbian Steel Tank Co.,
Kansas City, Mo., is manufacturing a hoist universal both in capacity and adaptability to all makes of trucks, being sufficiently powerful for the larger trucks and not too heavy for the one-tonners. A signal feature of this hoist, known as the Columbian, is its narrow compact construction.

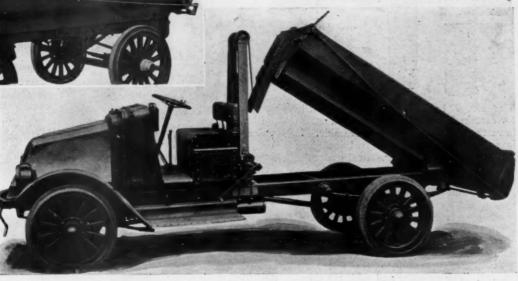
Columbian hoists are easily attached. They may be attached to any width chassis as the iron clip pads or shoes with which the hoists are provided and on which the hoists rest, are adjustable inward or outward to any desired dimension. The hoist is secured to the chassis frame by 4 U-bolts which concludes the operations entailed in mounting the hoist,

price if the hoist is bought separate from the body. In such event the hinge may be obtained for \$8.70 for sizes up to 4ton, and beyond 4-ton, \$11.70.

The Columbian steel bodies are made in two standardized patterns, namely, Model F, which has flared sides at the top and Model S, which has straight sides. They are constructed throughout of selected open-hearth steel. The bottoms are extra reinforced and all the inside rivets are countersunk, making a smooth inner surface. The sub-frame is almost entirely of channel iron and I-beam construction, the only wood employed being a narrow strip acting as a buffer between the horizontal steel sills and the chassis frame.



Lift is Accomplished Through Bevel and Spur Gears Having Sufficient Reduction to Permit of Easy Operation.



The Columbian

Hand

Mounted

on a Troy

Trailer.

The hoist itself occupies but 8 in. of space on the truck frame, and with the additional 3 in. allowed for the thickness of the lift arms, which are provided extra and are attached to the front of the body, permits the body to be mounted within 11 in. of the driver's seat. The height of the hoist which is 66 in., which is within the average height of the cab, permits unobstructed passage under low head room.

This hand operated hoist is constructed of very few parts, thus reducing the possibility of disorder. Lift is accomplished through bevel and spur gears having reduction sufficient to enable the operator to dump an average load rapidly and easily. As the body elevates the hoist inclines slightly toward the body; this is made possible by the provision of a spring device where the hoist is attached to the truck. A perpendicular pull is exerted on the cables at all times because of this inclination, a feature said to minimize the labor of lifting. The body descends back to its normal position by gravity, although it may be stopped instantly at any position by a brake and ratchet device.

although in mounting the body a greater amount of time is required as the lifting arms have to be bolted and riveted to the body.

The price of the Columbian hoist is \$125 f.o.b. Kansas City, and includes U-bolts for attaching and lift arms for the body, and the body hinges; the hinge assembly, however, is not included in the

The tail gates of both models are operated by a lever on the side, which extends the full length of the body. Double acting tail gates and tail gate spreading devices are furnished at an extra cost. The list price of Columbian steel bodies exclusive of hoist, f.o.b. Kansas City, Mo., range from \$310 to \$637 for sizes from 27 to 135 cu. ft.

## Trucks Bring Education to Rural Communities

Regardless of the weather, whether intense heat or biting cold, the truck is bringing a better education to the very doors of the rural home. A number of schools are using adaptable bodies, enabling the truck to be used upon other work on Saturdays and when not carrying pupils to and from school. Some school lines are operated by farmers' cooperative trucking companies, who handle the transportation of the pupils at a fixed rate per pupil or per family. The El

Cajon Union High School, Calif., owns a one-ton Federal, with special bus body, that comfortably seats thirty-one passengers. This truck makes two trips a day, eight miles for each trip. The Anaheim Union High School, California, operates a fleet of Federals, covering a large territory.

West Virginia, next fall, will vote on a constitutional amendment that will make possible the bonding of the state to the extent of \$50,000,000 for the building of good roads.

# Hydro Dumping Equipment for Highway Truck

HE Hydro Hoist is manufactured by the Hydro Hoist Company, a subsidiary of the Heil Company, Milwaukee, Wis. The line of hydro hoists at the present time comprise four models for various sizes of any make of chassis. The No. 4 Hydro is built for trucks rated at threeton capacity, No. 5 from three to five and a half-tons, and No. 6 from six to ten tons.

cylinder through oilways. therefore, comes down only as fast as the oil is displaced and, as this displacement is uniform, an even downward movement results. There are only a very few working parts to the hoist, this simplicity makes it easy to operate and care for, as all parts are easily accessible. Moreover, it is stated, that the hoist does not interfere with the accessibility of the engineering department of this company furnishes installation and layout drawings which show how each outfit is to be mounted. The method of installing the hoist is comparatively simple. Power is taken from the front propeller shaft and transmission if amidships, and is applied directly to the pump drive, by means of a shaft and universal joint.

This company states that the improved design of this hoist makes it possible to dump an unevenly distributed load, or a load carried by a chassis with one of its rear wheels lower than the other. Still another feature is the fact that every inch of platform space is utilized by the dumping body as the hoist is located under the body. It also makes possible the use of a body with lower sides for a given capacity, thus making the truck easier to



Hydro Hoist Unit Complete

Oil reservoir is mounted above the mounted above the two cylinders direct-ly over the gear pump. Power is transmitted direct to pump through a shaft from the trans-

The No. 7 hoist is designed primarily for certain four-wheel drive trucks, which have the propeller shafts on the side. It is rated for trucks up to and including three-ton capacity. This vertical hydraulic hoist is mounted under the body. It is considered one of the simplest type of hydraulic hoist on the market. It consists of one or two vertical cylinders, depending on the location of the propeller shaft, mounted on the chassis frame just in front of the rear axle and about in line with the front shackle of the rear spring.

The hoist operates in the following manner. The cylinder and tank are filled with a medium engine oil. The gear pump, 2, which creates the pressure, is located in the manifold between the cylinder or in front of the cylinder. The pump is driven by power taken from the front propeller shaft or transmission, if amidships, and is applied by operating a control lever at the driver's

The oil passes through a port into the gear pump, and is carried by an outward rotation to the bottom of the pump, where it is forced out through a check ball valve. This keeps the oil from flowing back through the pump. An oilway carries the oil to the bottom of the cylinder, where the force is applied directly to the piston head. The pinion moves up until at the maximum height of its stroke, the piston head closing at this point an oil port, shutting off the supply of oil and automatically stopping the hoist. If the pump continues to rotate it merely turns in a bath of oil.

To lower the body a valve located in the back of the manifold or cylinder is opened. The weight of the body then forces the oil into the lower part of the truck parts, such as the transmission case and brake rods.

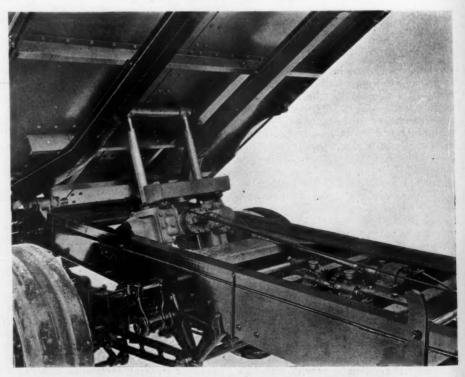
The control lever, which operates both the valve and sliding gear or clutch is located in the cab or with the gear shift.

All parts of the hoist are standardized and interchangeable. Gears are made of high-grade steel.

Practically every Hydro outfit will give a forty-five degree dumping angle. The

## Open-Shop the Coming Conflict

In a recent address in Pittsburgh before more than 800 railroad men from all parts of the United States, Dr. Charles Audrey Eaton said that the next important conflict in this country will be about the question of the open shop. "The labor union has performed a very successful function in America," said Dr. Eaton, "and is capable of still further service, not only to the workingman, but to the nation as a whole. The closed shop proposition that one group of private citizens have the right to tell another group where and when they can work will not be considered. Nothing could be more un-American."



The Hydro Hoist Installed in Chassis Retaining the Dump Body at an Angle of About 45 Degrees. Note the Non-Interfering Layout

## K & J Bodies Equipped With Either Hand or Automatic Power Hoists

HE illustration and descriptive details of the Kilbourne & Jacobs products, described in the April issue, page 30, of the COM-MERCIAL CAR JOURNAL, were inadvertently confused in its preparation. The Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio, provides its standardized steel dumping bodies with either a hand or an automatic power hoist. In the description the K & J power hoist was described in conjunction with an illustration of the hand hoist, to which reference was made by numerals. So in order to do justice to the product of this concern and for the benefit of those readers who have read this article, a corrected and additional descriptive detail and illustrations of both types are being reproduced below.

The automatic power hoist is a simple, one-speed transmission, using the engine's power to lift the body.

The power hoist is driven from the "sliding-jaw" clutch on the propeller shaft indicated by the figure, 1, in the accompanying illustration, through a chain. Its operation is controlled by a lever easily reached by the driver. The bracket, 2, on the hoist base provides means of quickly attaching the hoist to the chassis frame. The hoisting arms, 3, are attached to the lower front I-beam, cross-member by brackets riveted in place. When the body is in a normal position, the arms are retained flat under the body. In dumping they travel over rails leading up to the hoist columns. No stiff arms are said to project below the top of the chassis frame to cause trouble in dumping on uneven ground. The automatic hoisting mechanism, 4, automatically disengages at the total lift and total descent. This may be disen-gaged manually at 45 degress by a worm

After depositing the load the truck may be started while the body is at full dump, as the hoist will lower the body and disengage while the truck is in motion. The hoisting mechanism, which does not in-

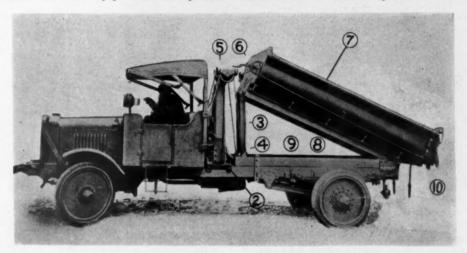
clude pump, cylinder or pistons, is entirely housed in a bath of non-fluid oil.

The overall hoist height is low and always the same, as there are no rising members. Cable winds on grooved drums apply the lift at the lower front body corners, first directly and then through hoisting arms. This system is said to practically eliminate back-pull on the hoist. Note the partial dumping tailgate opening, 6.

The rigid and adjustable underframe, 8, permits fitting to any width chassis frame without shop process. A deep hard-

iary shaft, B, which is supplementary to the main bearing shart, and which offers a further two to one reduction, is brought into play. The hoisting arm, 3, folds up under the body and travel rails, leading up hoist uprights, when lifting the body. The gears are protected and mounted with ample provision for lubrication, 4. One bearing casting is used for the three shafts, eliminating any possibility of misalignment of gears and irregular bearing surface.

The partial dumping tailgate, which enables the driver to spread material



K & J Automatic Power Hoist Retaining the Body at the Load-Discharging Angle

wood sill, 9, not only strengthens the frame, but also provides a buffer to cushion any shock transmitted to it by the body. The dumping body is attached to the truck frame at the rear by stout hinges, which also tends to prevent sidesway in dumping.

The hand hoist is built almost along identical lines of the power hoist, and is therefore also simple in construction. It can be readily operated by one man, power being applied through a system of gears. The crankshaft A can be satisfactorily brought into operation for ordinary lifts, but for heavy loads an auxil-

while driving, is manually operated from the seat.

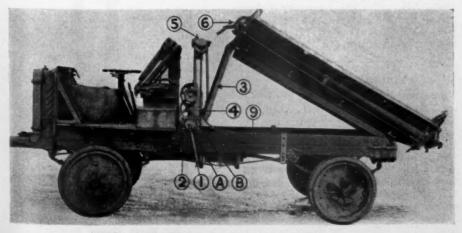
The quadrant at the forward end of the body is ratcheted and a controlling lever may be placed in any notch to regulate the tailgate opening.

In general, the hand hoist is greatly similar to the automatic power hoist.

## Canada's Good Roads Program \$50,000,000 in Five Years with Federal and Provincial Governments in Co-operation

In the next few years the Dominion of Canada and the Provinces will spend \$50,000,000 upon road improvement, of which \$20,000,000 is to come from the Federal treasury and \$30,000,000 from the various provinces. This highway legislation passed Parliament at its regular session last year. The work will cover five years, and will be apportioned substantially though not exactly upon a population basis. Eighty thousand dollars per year is set aside for each province. Expenditures are to be made for construction and improvement, not for maintenance.

Active construction of highways in all nine provinces will begin at once. Attention will be given to "such main or market roads as have been designated by the province with a view to encourage production and stimulate trade and commerce"



The K & J Hand-Operated Hoist

## Fitz Gibbon & Crisp High-Hoist Coal Dumping Body

The Fitz Gibbon & Crisp high-hoist coal dumping body, which is built in all sizes up to four-ton capacity, simultaneously elevates and tips the body to an effective discharging angle. This hoist operates on the scissors principle, and is driven by power taken from the transmission. It is controlled from the driver's seat.

The body hitch, which is made of angle steel, is constructed so as to extend below the bottom of the body about ten inches, if possible, and, if necessary, the body can also be raised ten inches higher than the height of the hoist. The body hitch is bolted under the bottom of the body by a 5 x 4 bolt. There is said to be no side strain on this hoist, as the pull is erected in a straight line, made possible by pivoting the hoist on the chassis frame. This pivot arrangement is attached to a 2 x 6

Illustrating the Essential High Feature of the Fitz Gibbon &

Crisp Hoist. Built by the Fitz Gibbon & Crisp, Inc., Trenton, N. J. lifts the body to any angle, but retains it there even though the handle is released. This is made possible by the short lead of the worm, which will not give, thereby doing away with ratchets or other supporting devices. A single twist of the handle wedges the worm and automatically locks the body in any position.

The construction of this hoist is simple, the entire framework being made of best grade channel. The two channel uprights, braced by two plates above and below, which also furnish a bearing bed for the upper pulley and lower gear shafts, are pivoted on lower supports rigidly secured to the chassis frame to allow for a slight inclination rearwards when lifting the body. The lower front end of the body platform is secured to the two legs of an inverted



al
ch
dTwo Views,
Showing the
Simplicity in
Construction of
the Peerless
Hand Hoist.

The steel gears, all traveling on special bronze bushings are carefully oiled, each bushing having a dust-proof oil duct leading to the bearing. The gears revolve on long steel bearings, and have bronze bushings that are interchangeable, also interchangeable bronze bushings on the pinion and one on the gear end of the main shaft.

The steel collars on the main shaft, with special U-bolts, hold the chains secure without any possible chance of slipping, and on the other end of the chain are the special equalizing U-bolts to take care of any adjustment due to stretch in chains. This adjustment can be made by the driver of the car while the car is in motion.

## The Peerless Handhoist is a Single Cable, Quadruple Work Gear Drive

The Peerless hand hoist, manufactured by the Auglaize Motor Car Company, New Bremen, Ohio., is built in three sizes. The construction of these hoists are similar, varying only in size.

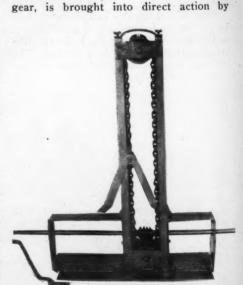
The posts and cross arms are built of angle steel, and the bearings are made of cast iron and are placed so that they do not receive any of the strain of the load lifted by the hoist. These hoists are riveted throughout. The worm and worm gear are protected by a sheet-iron housing. A flexible crucible steel cable is used.

wood sill, which is, in turn, clamped on the chassis frame by two U-bolts or by two plain bolts. The crank in an extension crank and can be shortened or made lower or longer to suit the operator. The hoist is held in position and kept from swinging back and forth by two brackets. These brackets are fastened to the body, but just as soon as the body is raised, they automatically release the hoist. The model A19, which has a capacity of from one to two tons, sells at \$75, and model B19, which has a capacity of from two to five tons, sells for \$90.

## Woodbury Hoist

The Woodbury Hoist is the product of the Steffen-Van Steenwyk Company, Sioux City, Iowa. It requires but five inches of space behind the driver's seat and can be mounted on any make of chassis in a comparatively short time by merely adjusting two clamps. The Woodbury Hoist is a very effective hoisting unit, and is especially adapted to take care of the lower capacity dump bodies.

This hoist, which is manually operated from either side of the body, not only



V-shaped iron, the apex of which is fas-

tened to one of the links of the chain.

The worm, which is in mesh with the

Woodbury Hoist, Designed Especially for Farm Dump Bodies

cranking, causing the chain, which encircles the lower auxiliary gear and upper pulley, to move up or down, raising or lowering the body. The pulley and gear

shafts revolve on ball bearings. A recent improvement on this hoist was the addition of a cap on the top of the hoist, which permits of chain adjustment when loose.

leveled. In the rear it is held by a mal-

leable spring clamp, bolted to the top

vision has been made for the locking of

cross-member of the rear frame.

the high-speed hoist at any point along the entire length of the beam trolley by means of a brake on the trolley.

The Hendrickson truck crane can be attached to any motor truck by any mechanic, as all the necessary equipment is provided with which to attach it. The prices and the minimum distance between hook and underside of beam and the size of "I"-beam vary in relation to the capacity of the hoist.

# The Hendrickson Crane and Trolley for Trucks

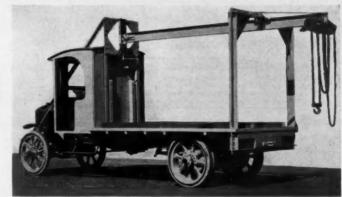
A truck crane capable of lifting from five hundred to ten thousand pounds, and put on the market especially for handling cut-stone and monuments, is the product of the Hendrickson Truck Crane Company, 352 Peoples Gas Building, Chicago, III.

This crane is made in various sizes to fit trucks of different capacities. They are made in two types, designated as type A and type B.

It consists of two frames, front and rear, constructed of angle irons and reinforced with flat steel bars and plates. The frames support a trolley which is a "I"-beam channel. The front end of the beam is supported by an adjustable screw mechanism by which the beam can be

Hendrickson Heavy - Duty Hoist and Trolley Mounted on Truck.

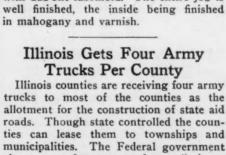
It has a capacity up to 10,000 lbs.



## Pneumatic-Equipped 16-Passenger Whitfield Bus Body

A 16-passenger bus body mounted on a Ford 1-ton chassis that has had its wheelbase extended by the attachment of edges of the sides. They may be readily removed for the replacement of broken glass. The rear center window may be raised or lowered for ventilating purposes. The ventilating windshield, made up of ¼-in. plate glass, is of the adjustable

two-section type. Exit is made through one door which is easily controlled by a lever operated from the driver's seat. The passenger seats are arranged parallel with the sides and across at the back. The driver's seat is provided with a spring back. The cushions used on the seats are built on the Staples & Hanford touring car spring construction and are covered with duPont fabrikoid. The entire job is



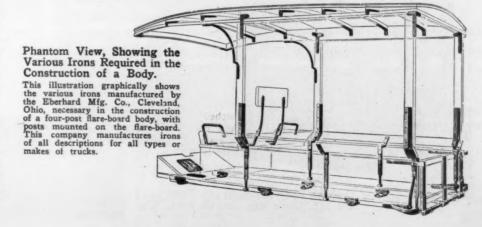
trucks to most of the counties as the allotment for the construction of state aid roads. Though state controlled the counties can lease them to townships and municipalities. The Federal government charges are \$75 per car for preliminary expenses, and \$100 per annum rental, the counties paying for all repairs, provide insurance against fire and theft. Illinois will secure between 300 and 400 trucks and use them in the state's \$60,000,000 bond issue road building program.



Sixteen Passenger Whitfield Bus Mounted on an Olsen Extended Ford Chassis

the Olson Extension, is the new well constructed job of W. H. Whitfield & Son, Penn Yan, N. Y., manufacturers of special auto buses, delivery and truck bodies, etc. This company states that the use of the Olson Extension eliminates the necessity of a sub-sill, thereby making possible a low body. This elimination has many advantages.

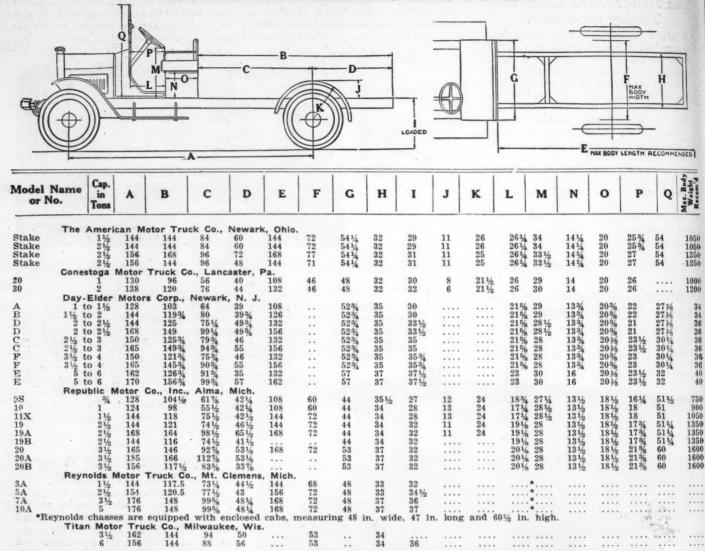
The 20-gage auto steel sides are supported on a white ash frame, well jointed and glued together. The curved posts that support the canopy are cut from natural crooks, no cross-grained stock being used. The side window frames containing D. S. A. glass are stationary, being permanently arranged along the upper

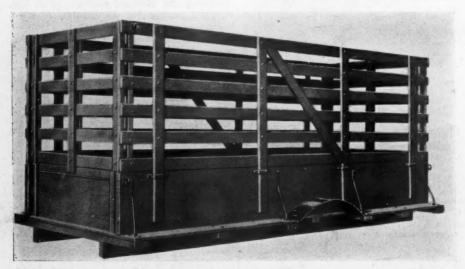


## Table of Chassis Dimensions for Body Builders

(Continued from our April issue)

Note: Where figures are omitted under columns J, K and Q, it denotes that rear fenders and windshield are not furnished with chassis





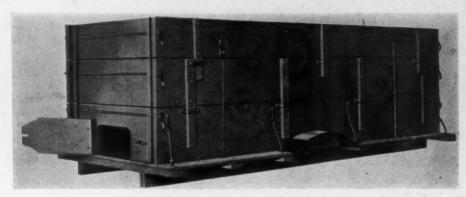
Convertible Clark of Oshkosh Body Arranged as a Stake and Panel Body. Built by the J. L. Clark Mfg. Co., Oshkosh, Wis.

## Clark of Oshkosh, All-Weather Cab

The Clark of Oshkosh line of cabs manufactured by J. L. Clark Mfg. Co., Oshkosh, Wis., are designed so as to be integral with the bodies. The all-weather cab was designed to fill the demand for a cab giving comfort to the driver at all seasons of the year. It can be closed tightly in winter and does not confine the driver in the summer. The doors and windows are fitted to do away with rattles and squeaks. This cab is 56 in. wide, has a slide window in the rear and drop window at each side of the driver. The doors swing on hinges, and can be easily removed for summer. They are optionally equipped with permanent or drop-type windows. The windshield is of the adjustable type. The back of this cab is constructed of solid wood and the side panels are of steel.

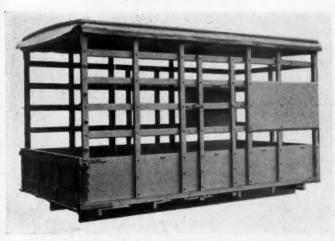


Clark of Oshkosh All-Weather Cab

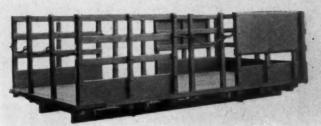


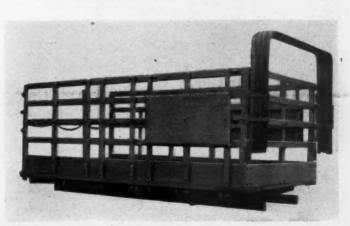
Clark of Oshkosh Farm Special. Built by L. C. Clark Mfg. Co., Oshkosh, Wis. This body, built especially for the farm truck, is substantially constructed along the lines usually pursued for farm service. The panels, which are 12 and 14 in. high, are of clear cottonwood. They are tongued and grooved, making for a grain-tight fit. Subsills, crossbars, running-boards, etc., are of cottonwood. The tailgate is hinged and the fenders are supplied as regular equipment. The two top boxes are removable.





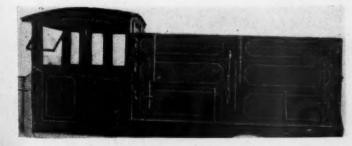






Views Showing the Metropolitan Platform and Four Types of Bodies to be Used in Conjunction With It. Built by the Metropolitan Body Co., Bridgeport, Conn.

The feature of this line is that the standard platforms can be utilized to construct 32 different styles of bodies, which permits the dealer to handle a full line without stocking up complete bodies, thereby economizing in floor space. Three different sized platforms are utilized to work out this arrangement. The Metropolitan line also includes a combination dump body with double-acting tailgate and removable sides. Metropolitan bodies are carried in stock in Boston, Bridgeport, New York and Philadelphia. The prices on Metropolitan bodies allow for a fair discount to the dealer.

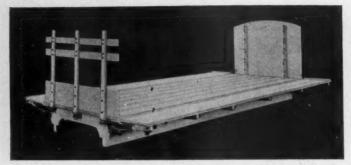


### **Matthews Combination** Grain, Stock and Cattle Body

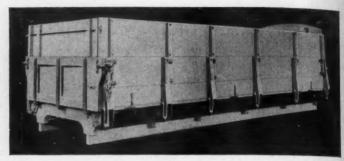
Cattle Body
This body, put out by the Matthews Carriage & Auto Co., Inc., 212 E. 3d St., Des Moines, Iowa, consists of panels that can be readily assembled or knocked down for various types of transportation. This combination body can also be fitted with stake racks. It is made in various sizes for all makes of trucks.

## Truck Reliability Contest

The start of the First National Motor Truck Reliability contest will be June 14th. Consideration was taken of the probable condition of the roads in May, due to excessive precipitation. Entries will close Saturday, May 22d, at midnight, and cars will have to be in the hands of the promoters at Omaha not later than Saturday, June 5th.



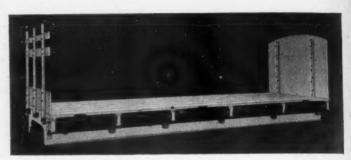
Body Arranged to Haul Irregular Bulky Material and, if the Sides Are Inclined Slightly Upwards, for Hauling Hay, Wheat, Oats, Corn Stalks, Etc.



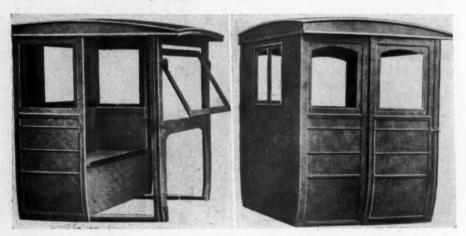
Arranged in Two Sections Although an Additional Section May be Added as a Tight Removable Side Box-Body for Hauling Fertilizer, Melons, Cabbage, Bulky Produce, Etc.



Combination Stock and Basket-Rack Box-Body for Hauling Hogs and Sheep; Also Fruits and Vegetables in Baskets, Boxes or Crates



The General Woodwork Body Adapted to Hauling Stone and Other Heavy Material



Two Views, Showing the General Woodwork All-Weather Cab the Doors of Which May be Removed in Warm Weather, Which, in Addition to the Opened Windows, Permit of a Free Passage of Air

Opened Windows, Permit of a Free Passage of Air

The windshield frame is of the adjustable ventilating type. Each side is provided with two windows and one twin window is provided in the rear

The General Woodwork Bodies Are Designed Especially for the Farmer and Are Adaptable for a Varied Service.

Service.

The General Woodwork combination body, manufactured by the General Woodwork Co., 125-35 Budd St., Cincinnati, Ohio, was designed particularly for the farmer, to give the farmer a wider range of use for his truck. This body can be quickly converted for different uses to cover the whole range of farm hauling. Eight complete types of bodies are combined in one. The progressive change from one type of body to another can be made quickly and readily. These bodies are made in two body lengths, 9½ and 11½ ft. They are well made and thoroughly ironed so as to prevent rattling, and are finished in lead paint.



## Anthony Automatic Rocker Dumping Body.

Dumping Body.

This body, which may be easily attached, automatically dumps and returns without the use of mechanical power. When loaded it is brought in action by depressing a lever in the center of the driver's seat, which releases the loaded body and tips it to angle of 50 degrees. When the load is discharged the empty body returns to its former horizontal position. These bodies are of steel and malleable iron, and are made in 1 and 1½-yd. capacity. They are manufactured by the Anthony Company Streator, Ill.

## Two Illinois Truck Lines Authorized

The Illinois State Board of Public Utilities has granted a certificate of convenience and necessity to the Staunton-Livingston Motor Transportation Company to operate a line of motor trucks between Staunton in Macoupin county and Livingston in Madison county. Passengers, express and freight will be handled and daily service maintained. At present, the two cities are not directly connected by rail lines.

The Arrow Motor Line Company has been granted a certificate of necessity and convenience for operating a motor truck line, between Chicago and Libertyville, Ill. It is proposed to handle passengers, freight and express, operating a daily service.

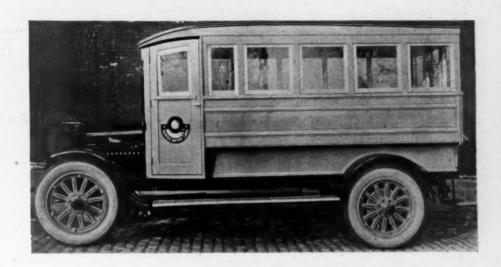


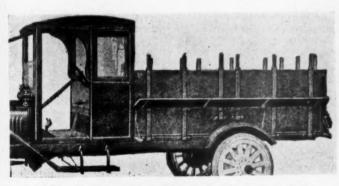
Rack-Top Type Truck Body Especially Adaptable for Inter-City Hauling. It is Built by the New England Truck Co., Fitchburg, Mass.

The platform of this body is constructed of oak throughout, 1½ in. in thickness, and reinforced and protected from wear by strap irons. Provision has also been made for the carrying of an additional tire under the body. This body is 12 ft. long, 6 ft. wide and 18 in. high.

## One of the Rainier Omnibuses, a Fleet of Which is to be Used in Palestine

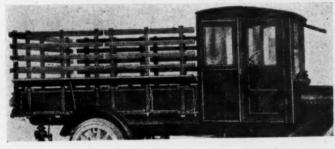
In order to meet a very evident demand for increased passenger transit facilities in Jerusalem, the Ramallah Company recently shipped several Rainier motor trucks equipped with special omnibus bodies to accommodate 25 passengers.





## Every-Purpose Convertible Body With Grain-Type Panels in Place

All joints are fitted and the panels arranged with special designed front and rear slipon panels. A feature of the "Every Purpose" line of bodies is the fact that they can be equipped with either one or three styles of cabs.



## Every-Purpose Farm Body Model No. 224 Built by the Commercial Auto Body Company, St. Louis, Mo.

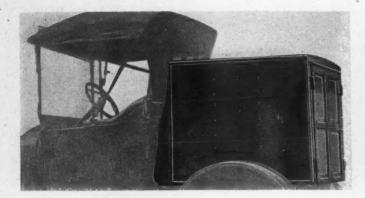
This illustration shows body with stock rack in place. The stock rack measures 33 in. above the panels, and are substantially constructed of hardwood and bolted together. They are built in two sections on the sides, one section in the rear and the other in the front. They are easily detached. The stakes go through flare-boards and fit into stake keepers on the panel sides. This farm body combines a solidly built express body, with a grain body and a flat body.

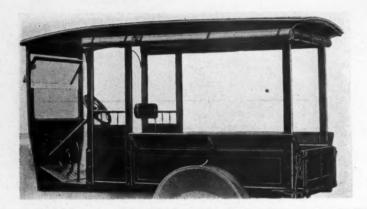


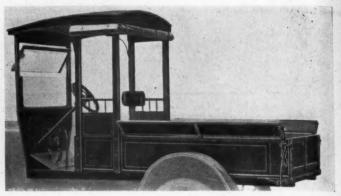


Showing the Great Western Combination Grain and Stock Body in the Two Styles

This body is constructed for all makes and sizes of trucks and can be readily converted from one style to another by one man. Very few additional parts are carried in this body. The sole part consisting of a top endgate, which gate is carried along at all times. Another feature of this body is the fact that an air space is provided near the platform of the body to permit of a free circulation of air, a very essential requirement in the transportation of hogs. This body is manufactured by the Great Western Commercial Body Co., 4th and Pierce Sts., Omaha, Neb.







Haberer Commercial Bodies Built for Ford Model Chassis. Produced by the Haberer & Co., Cincinnati, Ohio

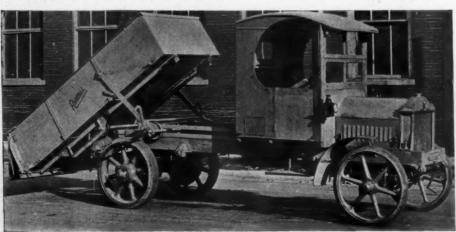
Produced by the Haberer & Co., Cincinnati, Ohio

The above are a few illustrations of the most practical designs of commercial bodies suitable for any line of business. This company has standardized the various parts, so that the details involved in making the bodies to order are eliminated and the cost accordingly reduced. The adoption of this system, also enables the carrying of a large stock. The materials used in building up these jobs are of the best. All bodies are equipped with a box spring cushion, neatly upholstered; lazy back; toe boards; bolts for attaching body to chassis, and the tops are fitted with roll-up curtains made of heavy waterproof material. Driver's storm curtains can be secured at extra cost, as well as fenders and windshields. The upper right-hand illustration shows an open express body with cab top; the windshield and storm curtains are provided as extra. This job provides a loading space of 44 x 63 in. The upper left-hand Illustration shows a removable box body painted black, mounted on a Ford model T chassis, and is known as model No. 15. It provides a loading space inside of 31½ x 40 in. by 31½ in. high. The lower center illustration shows a Haberer express body, model No. 20, mounted on a Ford model T chassis. The canopy of this job is supported by 6 posts, and it is also equipped with side curtains and rear curtains, which, in addition to the windshield, are supplied as extra. This model provides loading space of 44 x 53 in., and is 56 in. high.

# Randall Steel Dumping Bodies

HE Randall Steel Dumping Bodies Co., Chicago, Ill., originally established in 1916, but recently reorganized and recapitalized for \$50,-000 in 1919, is building dump bodies in 1½-, 2-, 2½-, 3-, 3½- and 4-yd. capacity for all makes of trucks. The company also turns out 1 and 11/4-yd. capacity models constructed especially for the Ford 1-ton truck. The mechanism consists of a sub-frame on which is mounted axles with carrying wheels on which the body travels rearward. Upon reaching its maximum point of travel rearwards, gravity tips the body, which pivots on the rear wheels. The entire dumping operation is under the operator's complete control. An automatic arrangement releases the tail gate at the proper dumping moment. Means for the ready attachment of a spreading device, which permits of the even distribution of the material to be dumped over the ground while the truck is in motion, to the tail gate is also provided. The body and mechanism is self-contained, adaptable to any width or length of chassis frame, and requires no drilling of chassis to attach.

The two-way side dumping model is built in the same capacities, and operates on the same mechanical principles. As it is not necessary for the driver to leave the seat to manipulate the discharge, it is especially adaptable for mounting on trailers. In dumping from either side it throws the load clear of the truck or trailer wheels. The total weight is within the average truck body allowance.



Gravity-Actuated Randall Steel Dump Body

## Street Railway Opposes Buses

Efforts of public utility companies to put the Fay Motor Bus Co., Rockford, Ill., out of business, promises to fail. T. G. Fay is operating a line of motor trucks and buses between Rockford and Chicago; Rockford to Oregon, Ill.; Rockford and Camp Grant; and a line throughout the city of Rockford. The street railway and interurban lines, finding their revenue seriously affected by the business built up by Fay, filed complaint against him with the State Public Utilities Commission, insisting that he be required to make application for a certificate of necessity and convenience. The principal grievance of the street railway company relates to the city of Rockford. At the first hearing it developed that the Fay truck line was carrying passengers from Loves Park to the factories for ten cents, while the street car line was charging nineteen for the same service. The street car company objects to the truck line, claiming that neither can make money with both operating and that one or the other should retire from the field. In reply Mr. Fay stated that he had \$110,000 invested in motor trucks for hauling freight and passengers and if given the authority to operate, he would increase his investment to \$250,000 and would agree to take care of all the city transportation if the street railway company gave up the field. Fay also guaranteed more reliable and more satisfactory service than is now enjoyed. There is a likelihood that the city council will apportion certain districts which are not profitable to the street railway company, and permit Fay to operate his buses and trucks there.



# EDITORIALS



## Stop Wasting Gasoline!

NDER this title, an editorial appeared in a recent issue of a prominent Philadelphia daily newspaper, the Public Ledger, in which the necessity for saving gasoline was convincingly shown by figures, which indicate that about 3,000,000 gallons of gasoline are wasted a day. This figures to about one-half gallon of gasoline to each passenger car now on the roads. This waste is not due alone to leakage of the fuel system but mainly to the indiscriminate use of the car. The editorial goes on to show that the waste not only affects those that drive passenger cars, but indirectly affects the person that does not own a car, to wit:

"There are hundreds of thousands of motor trucks. They do a great work in the transportation of various commodities. There are hundreds of thousands of motor cars to be built this year. If the price of gasoline advances the cost of transporting goods will be increased and you will have to pay it in the higher prices you pay for eggs, for milk, for beef, for vegetables, for moving your household goods, for anything and everything you eat or use, for directly or indirectly it will be in the bill the general public has to pay.

A waste of one-half gallon of gasoline per passenger car per day means 1,095,000,000 gallons a year. Wow!

One gallon of gasoline will provide the energy to move a one-ton truck 15 miles, or to put it another way, it will move 15 tons of freight one mile. If the users of passenger cars would save the one-half gallon a day they waste it would equal 16,425,000,000 ton miles of haul.

Economy in gasoline means more than the general public appreciates. More oil is being used today than is being produced. That means the reserve stocks are being drawn upon. Curtailment of waste is imperative. It rests with users of gasoline to do voluntarily what otherwise they inevitably will be forced to do."

Incidentally, it might be mentioned that The Autocar Co., of Ardmore, Pa., has seen fit to reproduce this editorial as part of its educational advertising propaganda; also in the form of a circular which they are distributing broadcast. We believe that the whole industry would benefit if other truck manufacturers would supplement this propaganda by distributing "anti-waste gasoline" literature at this time.

## The Tendency Toward Pneumatic Tires and Higher Speeds

THERE is no more accurate indicator of the tendencies of modern transportation than the growing use of pneumatic tires on motor trucks.

Experience with trucks on the road culminating in emergency haulage over the highways necessitated by the late war, has demonstrated the advantage from a dollars and cents standpoint of the use of pneumatic tires and higher speeds, in not only long distance hauling between cities but even within the city limits.

The pneumatic tire on a truck is not a luxury. It is a time and dollar saver. In the shipping of all perishable goods, its advantages are well known. Eggs, garden truck, flowers, bakers' wares, etc., suffer much less damage than when not riding on pneumatics.

As a time saver, the possibilities of pneumatictired trucks were so forcibly demonstrated in almost every line of trade during the war that a wonderful incentive toward this modern equipment on trucks has resulted.

The possible speed of a three-ton truck, for example, is actually doubled from 12 to 24 miles per hour and the speed of smaller trucks increased in gradually diminishing proportion as we get down to the lighter vehicles.

It is, therefore, on the larger trucks that the application of giant pneumatics makes the greatest difference in performance. Well-known manufacturers are now beginning to place on the market trucks especially designed for pneumatic equipment.

The pneumatic-tired truck also opens a new field of transportation and hauling for the farmer and rural community. Its ability to negotiate plowed fields is nothing less than remarkable. It is the road locomotive of the future which for the first time in the history of man makes it possible for humanity to live at points remote from the so-called established lines of transportation. By this, we mean navigable streams and lakes, the shores of the ocean and the lines of established railroads.

By means of trucks, pneumatic-tired, men can now spread out and for the first time utilize to the fullest extent all of the available areas open to them. By means of trucks and we may say trailers, because road trains are certainly coming in the future, humanity with its activities ad infinitum can get its raw products in; its finished products out and enjoy all of the benefits of those living close to the old lines of transportation. Pneumatic-tired trucks on the road, therefore, mean the development of greater areas of our country than any one invention yet utilized by man.

Of course, this wonderful development cannot come without good roads—good roads everywhere

—a network and interlacing of highways to every nook and corner. But this will come. It must come and roads will be developed as the use of pneumatic-tired trucks on the highways increases. We have as yet but skimmed the surface of the possibilities of this most modern carrier, which even now has a capacity already equal to the combined freight-carrying ability of our railroads.

## National Ship by Truck for Short Hauls; Good Roads Week

BY the time this issue is in the hands of our readers the program scheduled for the Good Road Week, May 17th to 22d, will be well under way.

Tentative plans include motor truck tours lasting through the week and covering virtually every section of the country. Many rural sections of the country from coast to coast will be traversed by caravans of motor trucks, giving practical demonstrations of the utility of truck transportation and preaching the doctrine of better highways.

The program for the week includes; national advertising which will reach more than 6,250,000 copies circulation; distribution of 145 films carrying a message of motor transportation and national highways; truck tours radiating from 50 cities and parades in 15 others, proclamations issued by ten governors; circulation of more than 1,000,000 copies of a handbook on national highways; letters from the National Grange, the National Automobile Dealers' Association, the American Automobile Association and other national organizations.

As a special feature H. S. Firestone has offered a four-year scholarship prize to the high-school student writing the best essay on the subject. The contest is to be conducted by the United States Bureau of Education, which is sending details to state, county and city school superintendents.

The following cities will conduct tours during this week:

during this week:

Chicago, Ill.
Philadelphia, Pa.
Minneapolis, Minn.
Duluth, Minn.
Eau Claire, Wis.
Salt Lake City, Utah.
Boise, Idaho.
Louisville, Ky.
Rochester, N. Y.
Dayton, Ohio.
Minot, N. D.
Youngstown, Ohio.
Boston, Mass.
Newark, N. J.
Scranton, Pa.

Wilkesbarre, Pa.

Chicago, Ill.
Columbia, S. C.
Detroit, Mich.
Denver, Colo.
Seattle, Wash.
Akron, Ohio.
Biralo, Ill.
Chicago, Ill.
Chic

The tours are not the only feature of this week's activities. The purposes of the week are to better emphasize the need for better highways and possibly a national highway system, and the subsequent advantages of the economic employment of the motor truck as a means of transport.

California trucking and good roads interests are making elaborate plans to tie up to "Good Roads Week." Tentative plans include a big tour of approximately fifty trucks under the name of The East Bay Ship by truck tour throughout Alameda and Contracosta counties, under the auspices of the Alameda County Auto Trades Association. Contracosta county is now building new highways which will be completed in the early summer, and will naturally open up the entire country to motor truck transportation to a remarkable degree. The purpose of the tour is to visualize to farmers, merchants and manufacturers in that territory the general utility of the motor truck.

The motor-car dealers association of San Francisco has enthusiastically endorsed the week and have voted to cooperate with their Oakland dealer in making that tour a big success. The Admens caravan from the northwest attending the national convention at Stock-

ton arrives in the Sacramento Valley on May 20th. Big plans are already being made by the California State Draymen's Association represented by M. J. Richert, of Sacramento, to arrange for truck demonstration from Chico to Stockton in connection with the admens tour. The ad clubs and automobile associations of Sacramento and Chico are particularly active in promoting this demonstration. Trucks will meet the caravan as they near Chico and escort them into that town, where, in connection with the auto truck and tractor show then in progress, a big reception is being planned. The southern part of the state is arranging for a tour of motor trucks, touching many important transportation centers in the South.

Undoubtedly the remembrance of the present railroad crisis will still be strong in the public mind during the week. It will, therefore, be a psychological time to dwell on what motor trucks have done and are capable of doing in any emergency.

## Discuss Highway Engineering and Transportation at Ann Arbor Meeting

The Ann Arbor, Mich., conference held on April 15th was called for the purpose of discussing plans for training men in highway engineering and highway transportation. The actual results of the conference are summed up in a resolution that was passed, calling for a national conference at Washington May 14th and 15th.

The principal speeches made in connection with the Highway Traffic Meeting, which was held Thursday evening, April 15th, were made by Commissioner Walters, Deputy Commissioner of the Detroit police force, and the Hon. Horatio S. Earle, well known as "Good Roads Earle" throughout the state of Michigan.

The discussion on "One-Way and Segregated Traffic Streets," by Commissioner Walters, showed certain opposition to one-way streets from the standpoint of business interests on the particular streets involved. The City Plan Commission in Detroit is making an effort to widen various streets in an endeavor to eliminate one-way streets wherever possible.

The use of segregated streets for trucks seems to be meeting with the approval of the public in general, and the owners of passenger cars in particular.

Mr. Earle, in speaking on the subject "Pavements Required for Economic Highway Transport," brought out the idea that all roads should be built strong enough to withstand all traffic over the road for the life of the road; in other words, if it is proposed to build a road to last twenty years, a careful survey should be made into the future in order to determine the amount of traffic and the probable weight of traffic that will go over that road in the course of those

It is intended to have another meeting of the Highway Traffic Association in the very near future, for it is believed that they are accomplishing a definite purpose in bringing before the country the need for an adequate system of highway transport.

The American Bosch Magneto Corp. has made a world's record in speeding up magneto production. In 1918 the average monthly production was 9031 magnetos. Last March nearly 40,000.

# News of the Trade in Brief

(For Factory Items. Personals, New Incorporations, Etc., See Pages 106-111)

## Service Stations Need Experienced Mechanics

NEW YORK, April 20 .- That there is a shortage of mechanics in the truck service stations and repair shops in this city was brought out at a special meeting of the Automotive Service Association of New York, held this evening. The meeting was called to discuss classification of mechanics, but it developed into a round table discussion of the need of workmen.

Practically every service manager present admitted that he could not obtain experienced and skillful men, that the workmen were restless and that "floating" was very prevalent. This condition appears to be borne out by the large number of advertisements appearing in the newspapers for automotive mechanics. It was also stated that mechanics were very independent, that upon the least provocation they would throw down their tools and demand their time. It was also pointed out in the discussions that the greater number of applicants were lacking in knowledge and that a very small percentage were given a trial in the shop.

Various plans were suggested. one receiving the most attention was advanced by a member who proposed that the association conduct a central registration bureau as a cure for some of the troubles. He suggested that every service manager, member of the association, fill out a card and file same with the bureau, the card to give the names of mechanics employed, their past experience and their capabilities. If the mechanic is an expert engine man, clutch, gearset, rear axle, etc., this is to be so stated. In other words the data is to index the skill of the workman.

Whenever a service station requires a man or men application is to be made to the bureau for the data on the applicant. For example: A truck service station needs a transmission mechanic. An applicant states he is an expert. Instead of the service manager spending considerable time questioning the applicant he will call the central bureau, obtain data and, if the applicant is a skillful transmission man he can be engaged. If not, the time of the service manager will be conserved.

It was pointed out by the proposer of the plan that men with a few months' experience will "float" to another shop and claim they are expert mechanics. erally they are given a trial with the usual result-they are dismissed. Personal instances were quoted by the speaker and they were supplemented by others in the discussion. The advantage of the plan as claimed by its originator was that all of the men now employed could be registered and that as new men were taken on or developed these also could be reg-

The meeting showed that some steps will have to be taken to develop automotive mechanics, that at present the demand exceeded the supply, and that with a further increase of trucks the shortage would be even more pronounced. Various suggestions were made, but none acted upon as W. H. Lange, of the association, will read a paper on the apprentice system and the possibilities of applying it to the development of mechanics at a future meeting.

## Coming Events

August 23 to 28, 1920—Stillwater, Okla. Oklahoma Farm Power Show, under direction State Board of Agriculture.
October 6 to 8, 1920—Northampton, Mass. Annual Automobile Show, H. F. of H. Agricultural Society, Three-County Fair Grounds. A. J. Morse, Secy.
October 6 to 16, 1920—New York. New York Electrical Exposition, three floors. Grand Central Palace, includes Electric Passenger Cars, Trucks, Industrial Trucks, Batteries. George F. Parker, Mgr., 124 West 42nd St. Batteries. Ge West 42nd St.

### Society of Automotive Engineers

New York City, N. Y. Society of Automotive Engineers. Coker F. Clarkson, Sec., 29 W. 39th St. Summer Conference, Ottawa Beach, Mich., June 21 to 25, inclusive. First day, Standards Committee meeting. Last four days technical sessions in forencon, recreation and sports in afternoon, lecture, and dancing in evening.

### CONVENTIONS

Asbury Park, N. J., June 22 to 25, 1920—
Annual Meeting American Society for
Testing Materials.
Atlantic City, N. J., October 22 to 25, 1920—
Twenty-seventh annual convention National Implement and Vehicle Association,
Traymore Hotel.
Chicago, May 9 to 12, 1920—Independent
American Petroleum Congress, Congress
Hotel.
Del Monte, Calif., May 20 to June 5, 1920

Hotel.

Del Monte, Calif., May 30 to June 5, 1920—
Mid-Summer Convention of the A. E. A.

Indianapolis, Ind., June 6 to 10, 1920—A. A.
C. Convention.
Indianapolis, Ind., June 6 to 10, 1920—Associated Advertising Clubs. General Theme:
"Advertising, How and Now."

Indianapolis, Ind., May 24 to 26, 1920—Service Managers Convention of the N. A.
C. C.

C. C. Isle of Palms, S. Carolina, June 24 to 25, 1920—S. Carolina Auto Trades Assn. Semi-Annual Meeting.
San Francisco, Calif., May 15 to 20, 1920—San Francisco Seventh National Foreign Trade Convention.
Winnipeg, Manitoba, June 1 to 3, 1920—Canadian Good Roads Assn. Convention. Royal Alexandra Hotel.

### Foreign Events

Foreign Events

Antwerp, Belgium—May 15 to June 13, 1920.
International Exhibition of Motor Cars.
June 26 to July 25, 1920—International Exhibition of Commercial and Agricultural
Tractors, Camions and Motors. August 1
to September 15, 1920—International Exhibition of Sports, Side Cars, Motorcycles,
Cycles, Accessories. Information and application forms may be obtained of James
Gustavus Whiteley, Belgian Consul, 223
West Lanvale Street, Baltimore, Md.
London, England—October—Commercial Vehicle Show. November—Passenger Car
Show, Olymphia.
Prague, Czecho-Slovakia—July 17 to 25, 1920.

Show, Olymphia.

Prague, Czecho-Slovakia—July 17 to 25, 1920.

Twelfth Annual Automobile Exposition, auspices Czecho-Slovak Automobile Club of Prague, Prague Exposition Grounds. Domestic and foreign exhibits of Land, Water and Air Motor Vehicles, Tractors, Accessories, and Automotive Manufacturing and Repair Tools and Machinery. Exhibits duty free, space 100 Czecho-Slovak crowns per sq. meter.

## Parrett Tractor Co. Under New Management

A motor truck adapted to the uses of the American farmer will be one of the new products to be turned out by the Parrett Tractor Co., of Chicago, which recently entered upon a new period of progress and expansion under the management of new executives. This will supplement the manufacture and distribution of the Parrett tractor, for eight years one of the best-known tractors in the farm field. In addition to these lines a motor cultivator will be manufactured and marketed, making the Parrett line particularly well adapted to the dealer who wants to meet the various needs of the consumer.

The new officers and board of directors elected are as follows:

President, Vincent Bendix; vice-president and general manager, George A. Gibson; vice-president and chairman of the board, Robert Barbour; vice-president and director of export sales, Russell A. Reed; treasurer, Curtis B. Bruce; secretary, W. J. Buettner. The board of directors consists of Vincent Bendix, Robert Barbour, Warren Barbour, Henry A. Rudkin, B. A. Tompkins, George A. Gibson and Curtis B. Bruce. The executive committee consists of Messrs. Bendix, Gibson and Bruce.

A glance at the business connections of the new officials will give the industry a good idea of what the company should be in the future. Mr. Bendix is the inventor of the widely used Bendix drive, used on the electric starters of most passenger cars and motor trucks, and he is associated with the Eclipse-Bendix Company in the manufacture of this ingenious device. He is a director in several manufacturing companies and his business connections cover a wide range.

George A. Gibson, the new vice-president and general manager, resigned the presidency of the Chicago Motor Truck Company to accept this office. Mr. Gibson was for two years production manager of the Diamond T Motor Car Company at their Chicago plant, and previous to that time was associated with the Packard, White and General Motor Truck companies in their sales department.

Robert Barbour is general manager of the Barbour Flax Spinning Company, of Paterson, N. J., and director of the United Shoe Machine Co. and Safety Car Heating and Lighting Co. Warren Bar-bour is president of the Linen Thread Co., of New York, and is a director of many corporations and banks in the East. Russell Reed was formerly with Russell Reed was formerly with the Oliver Chilled Plow Works, of South Bend, Ind., and is now at the head of Russell A. Reed, Inc., of New York, exporters of agricultural implements.

Curtis Bruce was formerly secretary of the Central Locomotive & Car Works, at Chicago Heights, and later became treasurer of the Parrett Tractor Co.

Tractor sales will be in charge of E. F. Sanders, who has been with the Parrett

company for some time.

Motor truck sales will be in charge of Herbert Scharlach, formerly sales manager for the F. A. Ames Company at Owensboro, Ky., later sales manager of the Sterling Motor Truck Co., of Milwaukee, and recently with the Republic Motor Truck Co., first in charge of eastern sales and then of western territory.

Announcement will be made later as to motor truck and power cultivator lines.

## Movie Film to Arouse Good Roads Interest

A highway educational enterprise has been launched in Virginia never before attempted by any state, according to highway officials and others connected with the better road movement. General C. C. Vaughan, Jr., president of the Virginia Good Roads Association, and D. B. Ryland, of Lynchburg, secretary, have contracted for the production of a film to be entitled "Virginia's New Hour," in which an effort will be made to get before the public a complete revaluation of the state in the minds and heart of the people, and to create a new conception of the high-

way as a public utility.

"One of the fundamental points we are striving for, "says General Vaughan," is to turn the tide of youth back to the farm. We realize the magnitude of the task we have assumed, and we hope to set in motion forces that will in due time result in placing a check upon the disproportion between the progress of the fields and that of the cities, between that of industries and that of agriculture. As we see it, the old type of earth road is at the bottom of the trouble, and we hope in the scope we are taking in "Virginia's New Hour" to bring to the people of Virginia a new and higher conception of what the road means to their prosperity and happiness and to the future development of our state."

## Motor Truck Club of New Jersey Urges Vehicular

Speedy construction of a vehicular tunnel under the Hudson river by the use of the type recommended to the present commissions by their engineers was urged in a resolution adopted by the Motor Truck Club of New Jersey recently.

The club approved the construction of a tunnel with twin tubes of cast iron, lined with concrete, and having an external diameter of 29 ft, and providing two lines of vehicular traffic through each tube with a roadway 20 ft. wide.

Thomas J. Wasser, county engineer, of Hudson county, stated that there is danger of great delay in the construction of the tunnel unless action is taken by civic and motor organizations urging the pub-

lic to adopt the plan proposed by the present commission.

"You are not going to get this tunnel unless you do something. I suppose you want it, so here is an opportunity to show what strength the Motor Truck Club of New Jersey has. It is not a question of whether the tunnel should be constructed of steel or cement, but a question of 'do you want the tunnel?' that is to be answered. Leave the type of construction to the five competent engineers who have made a study of the problem. What the truck owners want is a link between New York and New Jersey under the river in the speediest time possible."

His particular interest was in the approach planned for Jersey City. He urged that the plans for twin tubes of 20-ft. roadway, such as have been suggested by the commission, be approved. He showed by lantern slides how three tubes would result in vehicular congestion at the entrance of the tunnels because of lack of sufficient space.

## Discuss Commissions and the Trade-in Evil

NEW HAVEN, CONN., April 13.-For some time past efforts to revive the local automobile dealers' association have failed to create interest, but with economic problems confronting them those dealers who did not actively support the old association have been sold the value of organization. As a result of conditions the dealers in New Haven have organized the New Haven Dealers' Association and at the present time of writing there are but four dealers eligible to membership who are not members. The association includes thirty-six at present, and of this number twenty-four merchandise trucks, also passenger cars. Four are dealers in

### Define Bona-Fide Dealer

The association defines a dealer "as one that maintains a bona-fide place of business; has suitable space for the display of vehicles; has a sign display of the name of the concern and the vehicles represented; keeps at least one demonstrating or exhibition vehicle on hand, and sells twenty-five vehicles a year.'

Another section states that "All members of this association shall adhere to and maintain the catalogue price on all motor vehicles and sell them as equipped by the manufacturer. Commissions shall be paid only to recognized dealers acting as dealer or sub-dealer. They shall not pay in any manner whatsoever any commission to chauffeurs or curbstone brokers."

At a meeting recently the matter of the trade-in evil was discussed and a committee appointed to investigate the Troy, N. Y., used-car exchange plant The trade-in evil is prevalent in New Haven, and the local association proposes to correct it if possible. A special meeting is to be called for this purpose.

The labor situation was also discussed. Outside disorganizers are endeavoring to promote a union of mechanics, and the

dealers are opposed to it. Several dealers have experienced trouble of this kind, but it is believed that they now have the situation well in hand. It is not a question of hours or money that the dealers object to, but the disadvantages of unionism, as it will work out with mechanics in the repair shop.

The officers of the association are: President, C. M. Bradford, Bradford & Lomas; vice-president, H. F. Flowers; secretary, W. A. Rutz, White Motors Company; treasurer, Cowles Tolman, board of governors, Harry Brown, G. B. Wuestefeld, E. L. Babcock and N. L. Beaver. Membership committee, chairman, J. J. Laverty; N. B. Whitfield and H. M. Howard. Committee on exhibitions and shows, chairman, H. F. Flowers; G. B. Wuestefeld, Sherman Lee, W. A. Rutz and Cowles Tolman. Committee on good roads: J. Wesley Platt, W. A. Kirk and G. C. Tower.

## Statement of the Ownership, Management, Circulation, Etc.

Required by Act of Congress of August 24, 1912

Of COMMERCIAL CAR JOURNAL published monthly at Philadelphia, Pa., for April

State of Pennsylvania.
County of Philadelphia, ss:
Before me, a Notary Public in and for the State and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMER-CIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, directing editor and business manager are:
Publisher, CHILTON COMPANY, 49th & Market Sts., Philadelphia, Pa.
Editor, James Artman, Narberth, Pa.
Directing Editor, E. S. Foljambe, Drexel Hill, Pa.
Business Manager, C. A. Musselman, 4203
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2. That the owners are:
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George A. Buzby, Wellington Apartments, 19th & Walnut Sts., Philadelphia, Pa.
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JAMES ARTMAN, Editor.

Sworn and subscribed before me this 22nd day of March, 1920.

(Seal) GEORGE H. SHEVLIN.

## Goodyear Will Start Bus Service in Akron

To offset inadequate street car service in Akron, Ohio, which has earned the name of being the fastest growing city in the United States, The Goodyear Tire & Rubber Company will start operation of a 10-car motor bus service on June 1, the lines being routed into all outlying sections.

Establishment of the new bus line was decided after a conference with city officials in an effort to devise a means of affording adequate transportation to the 160,000 inhabitants who have augmented the 40,000 shown by the 1910 census.

For more than a year the Goodyear Company has operated a bus line to serve 3000 families living in its housing section, with excellent results.

The type of bus to be used in the new Akron lines will be similar to the one-man street car. Each bus will carry approximately twenty-four people, who will pay as they enter. Buses will be enclosed to give shelter from the weather, but also be well ventilated at all times and heated in winter.

## New York Service Association to Consider New Plan of Educating Mechanics

NEW YORK, May 5th.-For the first time since the Automotive Service Association of New York was organized, was the principal speaker of the evening a representative of the truck industry. Last evening W. H. Lang, of the Three-Point Truck Company, read a paper entitled, "Can the Apprentice System Be Revived?" Mr. Lang has long been identified with the automotive industry and has made an intensive study of the service problems insofar as the mechanic is concerned, and in remarks preceding the reading of his paper pointed out that the shortage of expert mechanics had reached a critical stage. He called the attention of the service managers present to the increasing use of automotive vehicles, and said that unless some well-defined attempt was made by those interested to provide for the future, conditions would be even more serious than at the present time.

## Apprentice Must Have Incentive

Mr. Lang did not advocate the revival of the old-time apprentice plan for developing skilled mechanics, but suggested that the Automotive Service Association of New York and others, for that matter, appoint a committee comprising service managers and heads of the technical automobile schools, and that the local committee co-operate with the Service Division of the N. A. C. C., and with the Automobile Dealers' Association of New York, in an effort fo formulate some plan to develop trained mechanics.

What was needed, said the speaker, was first technical training of the young man so that he would acquire the fundamentals. This, coupled with practical work in the service station, would develop the stu-

dent. Mr. Lang suggested that the foreman or superintendent of each service station devote an hour or two daily, if possible, to intensive, practical educational work with the novice, teaching him the steps of various work.

## Must Have Living Wage

"During the period the student was being educated or trained he should be paid a living wage," said the speaker, who pointed out that in other trades the apprentice or helper received suitable compensation. Mr. Lang said he believed that if a concerted effort was made to interest the young man in the possibilities in the service station work, and the value of his attending a technical school at night while serving his time, that results would be obtained. The speaker said that the dealers must co-operate if the plan is to

be satisfactorily developed. · A representative of the Y. M. C. A. schools for mechanics stated that his association was confronted by two problems. One was that the student desired to obtain in a few weeks knowledge that required months. The other was that the schools needed some well-defined standard to work on, and that if the service associations would co-operate in this respect the speaker believed that results would be obtained. The Y. M. C. A. representative mentioned a plan that was under consideration by his association. It was to pair the students and have them alternate. For example: One will be at school on Monday while the other will be at some service station. They are to be paid a slight wage by the service station. This would, said the speaker, sup-

### Will Educate Young Men

ply the station each day.

Several service managers present stated that they would devote time to students or apprentices under the plans outlined. On motion, the chair appointed a committee comprising service managers and heads of technical automobile schools, and this committee is to have the power to formulate a plan for developing raw material. It will co-operate with the Service Division of the N. A. C. C., but first will ascertain the views of the dealers. It is believed that dealers endorse the plan.

One of the features of the meeting was an illustrated lecture on the manufacture of lubricants by a representative of the Tidewater Oil Company. The various steps from the time the crude was taken from the earth until the finished products were obtained were explained and illustrated in an interesting manner.

## Interstate Motor Truck Owners' Conference in Philadelphia

An Interstate Motor Truck Owners' Conference was held in Philadelphia April 7 and 8, in the Chamber of Commerce. E. M. Bird, president of the Pennsylvania Motor Truck Owners' Protective Association, declared the object of the meeting to be the establishment of a national organization in order to secure a united co-operation amongst the owners and managers of truck hauling and general

truck transportation in the United States; to foster and promote the general welfare of their business; to guard the motor truck transportation interest as it may be affected by State and Federal legislation; to protect the motor transportation business against any oppressive, arbitrary or unjust administration of the traffic laws and regulations; and to promote laws for the maintenance of the rights of motor truck transportation; to promote Federal and State laws for the maintenance and improvement of highways and to gather and disseminate practical and useful information in the development and promotion of motor truck transportation in all its relations to American industry.

Nine states were represented, including New York, Illinois, Connecticut, Ohio, Pennsylvania, New Jersey, Indiana, Delaware and the District of Columbia. Among prominent men interested in motor truck transportation present were: Lee Lemar Robison, of the Council of National Defense; C. W. Reed, Federal Highway Council, Washington, D. C.; B. A. Finkelstein, representing the National Automobile Chamber of Commerce; William E. Hague, Ohio; Seward Price, Connecticut; Tom Snyder, Indiana. New Jersey was represented by Harry A. Douglas, F. J. Wittenboen, Thomas J. Bruther, Trenton; H. J. Stone and Charles S. Carty, Camden. Pennsylvania was represented by George I. Oberholtzer, R. E. Eggleson, E. M. Bird and S. A. Rosenthal, Philadelphia; J. E. Barrett, J. R. Rodgers, Chester; William Land, Scranton; W. W. Sheepy and J. E. Fitzgerald, Easton; Joseph Hussen,

New York.

The address, in part, of Secretary Fleming upon the roll-call was as follows:

The great transportation problem of today and the near future includes the great water carriers, the steam railroads and the modern motor trucks. In this trinity the motor truck is as essential as either of the other units in the commercial and business life of the nation. Why do the railroads attempt to check it? Certainly steamships are dependent upon motor trucks to have their cargoes delivered at the wharves.

Who is it behind the legislative effort that are constantly attempting to cripple the general transportation by motor truck? Why is it necessary to increase motor truck taxes and license over 250 per cent? Whose hand is behind it? Is it to eliminate the profits to the men who are struggling to build it up and force them to quit? Motor truck transportation is here to stay and continue to grow. Whose hand is behind the legislation to hamstring and limit its utility? If county roads are too narrow for wide trucks in the face of necessity and progress, the answer is, widen the road and not narrow the body of the truck. If such roads and city streets are too soft and mushy to stand the weight of loaded trucks the answer is, make the roadbeds and streetbeds sufficiently strong to bear the weight of loads within reason, and not circumscribe the development of truck transportation to the injury of all.

# NEW COMMERCIAL CARS











# The New Eagle Two-Ton Truck Contains Standard Make Units

FTER carefully analyzing the truck transportation situation throughout the United States, the Eagle Motor Truck Corp., of St. Louis, Mo., decided that there was a definite demand for a conservatively priced heavy-duty 2-ton truck. To meet this demand production was started, in a new plant recently

from the general trend of design is the starting crank which is hinged on a universal joint and while the truck is in operation it is folded back and hooked up out of the way. This crank extends beyond the front of the bumper, allowing the operator to get a full unhampered swing. Still another feature is the side lamps

shaft equipped with Merchant & Evans double universal joints, with slip joint to allow for spring action to a Russel internal gear rear axle. Alignment of the drive shaft is maintained by a self-aligning center bearing. The rear axle is rated at from 2½ to 3 tons capacity. The load is carried on a 2½-in. solid chrome nickel steel dead axle. All the gears in this assembly are drop-forged, heat-treated and hardened. The wheels, which revolve on Timken roller bearings, are equipped with extra wide concentric drums and powerful internal expanding and external contracting brakes.

The cooling system includes an extra heavy water pump having 1\%-in. intake and 2-in. outlet water connections and a cellular type radiator. The radiator is made up of extra heavy cast iron sides and provides ample water capacity. Cast in the radiator cap is a bronze eagle forming a part of the cap. This eagle is the trade mark of the company. Cooling is further assisted by an 18-in. fan with 2\%-in. heavy belt.

Ignition is by an Eisemann high-tension magneto with impulse starter. Carburetion is through a Zenith non-adjustable carburetor equipped with a hot-air intake attachment similar in construction to those used in the U. S. airplanes. The gasoline is stored in a 15-gal. tank located under the driver's seat. The front axle is Columbia of conventional I-beam section.

The frame is carried on extra heavy, alloy steel, semi-elliptic front and rear springs. The rear springs, which consist of 16 leaves, are 3 in. wide. The front springs are made up of 10 leaves. The heavy artillery wheels have 14 square type spokes, which are 2½ in. thick in the rear, and are equipped with steel rims. Firestone pressed on solid tires 34 x 2½ in. front, and 34 x 6 in, in the rear are stand-



Side-Front View of the Two-Ton Eagle Job

erected by this company on 5154-5164 Bartmer Ave., on a full-rated, 2-ton truck having an overloading provision. Standardized, concentrated production of one type of truck is the principle under which the Eagle organization is at present operating. The various units incorporated in this truck are among the best of their respective kind, parts such as the Buda engine, Covert transmission and clutch, Russel internal gear drive axle and Lavine steering gear being used.

The Eagle Motor Truck Corp., was incorporated December, 1919, with T. Y. Ayars, president; J. P. Reis, first vice-president and in charge of production; Mr. Reis was the designer of the Eagle truck; H. L. Yawitz, second vice-president; J. W. Hay, treasurer, and R. E. Fitch, secretary.

The construction of the 6-in. "U" channel steel frame, which is 198 in. long, is flexible and strong. Special attention is called to the front cross members which form a heavy bumper for the truck. This bumper in addition to forming a part of the frame is made in such a manner that it may be removed in the event of a collision distorting or breaking it, and a new one replaced. All the joints are double riveted and the entire frame is reinforced by extra steel bracing. Another deviation

which are attached to the sides of the radiator instead of on the dash as in conventional practice.

The four-cylinder removable head, Buda unit power plant, having a bore and stroke of 33/4 x 5/4 in., respectively, is suspended from three points. Power is transmitted through a Covert, dry, 5-plate, multiple-disk clutch to a Covert transmission which provides 3 speeds forward and one reverse. All the gears are of nickel steel with wide teeth for carrying heavy loads. From the transmission the power is carried through the propeller



ard equipment, but it may also be equipped with pneumatic cord tires if desired, at \$250 extra.

Steering is through a worm and gear type, irreversible Lavine steering gear with an 18-in. wheel. Gear-shift and handbrake levers are in the center. Hand throttle and spark controls are mounted on the steering column. The Eagle truck is made in two wheelbase sizes. The standard wheelbase is 120 in. and the special, 156 in.

The standard equipment includes two side oil lamps attached to radiator, tail lamp, explosion whistle, set of tools, seat box, full fenders with aprons, and running boards. The price is \$1925 for chassis with seat, f.o.b. St. Louis, Mo.

## Many Changes Mark the New 1920 Line of Acason Trucks

HE Acason Motor Truck Co.,
Detroit, Mich., in announcing its
new 1920 series of trucks which
consists of five capacities, namely, 1, 1½, 2½, 3½ and 5 tons, stated that
not only is there a change in price but
in a number of its component parts as
well. In making the announcement,
President H. W. Acason, said, "These new
models, in power, gear reduction and road
speed meet with the modern requirements

of both intercity transportation and if equipped with dump bodies, also for the heavy work of excavating and road building. Their characteristics are particularly adapted to the use of pneumatic cord tire equipment, as no changes are necessary to use this equipment to the best advantage."

The full floating Timken worm axle, one-piece housing

with Timken roller bearings in both front and rear axles is still con-An Eisemann high - tension magneto with impulse starter provides ignition, and gasoline is atomized by the Marvel carburetor, superheated by the exhaust from the engine. The power plant is a new Waukesha with cylinders of the split-head design. All main rods and piston pins are lubricated by the force feed system which incorporates a geared oil cup, capable of developing an 8-lb. pressure at 1000 r.p.m. The speed is controlled by the Waukesha governor which is built integral with the motor, operating directly from the timing gears and is adjustable to any speed. It is entirely sealed and self-lubricated.

The cooling system which includes a fan and water pump forces the cooling liquid through a radiator of the built-up type with detachable finned tubes. The

entire system can be drained from one point. Protection is afforded the radiator from possible collision by a specially designed radiator guard.

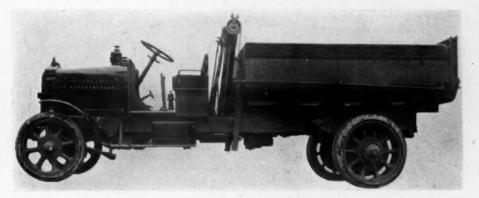
Power is transmitted from the engine through a multiple disk Raybestos lined clutch which is inclosed in a separate bell housing to a Cotta transmission. The clutch throw-out bearing is lubricated by a sight feed oiler from the dash. Four speeds are provided by the constant mesh

lubrication, thereby doing away with grease cups. An Alemite grease gun giving 800 lb. pressure is supplied for this system as standard equipment.

The following specifications of the 5-ton model conforms in general to the other models, differing mainly in the dimensions of the various parts relative to the different capacities. The Waukesha engine of the 5-ton model has a bore and stroke of 5 and 6¼ in., respectively, and

is rated at 60 h.p., making 14 m.p.h. standard road speed. The standard low gear reduction is 55:1 and optional 60:1. The crankshaft diam. is 21/2 in, and 16 plates make up the clutch. The 187in. wheelbase permits of a loading space from the back of the seat to the end of the frame of 13 ft. 6 in. The duplex expanding brakes on the rear

wheels measure 24 x 4 in. The section of the pressed steel frame measures 9 x 3 in. flange, and 5/16 in. material. The semi-elliptic springs are 3 in. wide and 42 in. long in the front, and 4 in. wide and 56 in. long in the rear. The capacity of the gasoline tank is 24 gal. The Smith steel wheels are equipped with solid tires, 36 x 6 in the front, 40 x 6 in the rear, or 40 x 12 pneumatic Giants in the rear. The list price is \$5850.



Latest Five-Ton Acason Chassis, With Steel End Dump Body and Hydraulic Hoist

Cotta transmission which is mounted amidships. It is fitted for the ready connecting up of a tire power pump and power takeoff. Easy access to the transmission which can be removed in a unit, in case of repairs, is made possible by removing a large inspection cover on the top of the case. This unit can be removed through the opening without interfering with the other parts of the chassis. The power is carried to the rear axle through a standard propeller shaft equipped with Blood universal joints fully inclosed in leather boots packed with

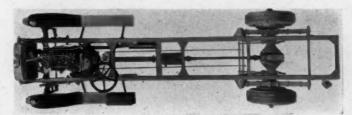
The steering gear is a Ross, of the worm and nut type, mounted on the left side. All the steering gear connections are inclosed in leather boots and packed with grease. All the essential points requiring lubrication on the chassis are taken care of by the Alemite system of

## Correction

The caption of illustrations, used in connection with article on Babcock stake bodies and cabs, which appeared on page 36 of the April issue of the COM-MERCIAL CAR JOURNAL was inadvertently mixed in preparing the copy. The caption should have read as follows: Right, model 62-M; lower right, model 62, and lower left, model 62-C.



Three and a Half-Ton Acason Truck. Transmission
Amidships



Overhead View, Showing Disposition of Units

## 1920 Models of OK Trucks

N announcing the 1920 line of OK trucks, the Oklahoma Mfg. Co., Muskogee, Okla., discloses three models. These models and their prices are as follows: 1½-ton, \$2450; 2½-ton, \$3250, and 3½-ton, \$4150.

All of these models are of the same design, construction and workmanship and vary only as to capacity and size. All have Buda 4-cylinder engines; Eisemann magnetos, furnishing ignition current; Stromberg carburetors, having 1½-in.

ple water space. The copper cores of this radiator are protected by a radiator guard attached directly to the radiator. Cooling is further assisted by an 18-in., tour-blade, ball bearing equipped fan. A full-force feed system of lubrication, through drilled crankshaft to all bearings, is employed. This system is of the self-contained positive pressure feed, with pressure regulating valves, the oil being pumped from the oil-reservoir, which is located beneath the crankcase, by a gear-

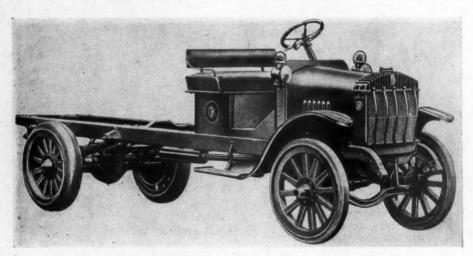
with three Hartford universal joints to a Wisconsin worm drive rear axle. The No. 800-H model is used. The gears and worm are of nickled steel and the worm gear and beveled gear differential are of phosphor bronze. All friction parts are completely inclosed and run in a constant bath of oil, free from grit, dirt and the elements. The axle housing is one-piece and has integral spring pads. The gear ratio is 9 2-3:1.

The Shuler front axle is a conventional heavy "I"-beam forging with Elliott type steering knuckle, large spindles, Timken ball bearing and steering arm with 1½ in. ball fore and aft movement.

Two sets of brakes are provided on the rear axle, one operated by foot and the other by hand lever. The internal-expanding service brake, which is operated by foot, expands on a 16%-in. drum, 2½ in. wide, and the emergency brake, which is operated by hand, contracts on a 11¾-in. drum, 2½ in. wide.

The steering gear is of the worm and nut, irreversible type, mounted on the left side. It has an 18-in. steering wheel. Gas and spark control levers are mounted on the steering post. The pressed steel semi-flexible frame with side rails is 53¼ in. deep by 3-16 in. thick. It is reinforced by five cross-members and is suspended on four semi-elliptic alloy steel springs, 38 in. long by 2½ in. wide in the front, and 54 in. long by 3 in. wide in rear.

The heavy, wood artillery type wheels contain 12 square spokes, 134 in. wide, in the front, and 12, 214 in. wide, in the rear. They are equipped with solid tires, front and rear, measuring 36 x 31/2 in. in the



The Three Sizes of OK Chassis Follow the Same Lines of Design

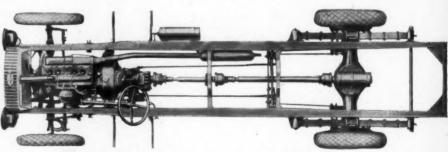
openings and equipped with hot-air intakes; Fuller transmissions, of the selective type, mounted in unit with the engine; Hartford Universal joints; Wisconsin worm drive rear axles; worm and nut irreversible type steering gears, and other minor parts, which are also similar. This almost complete standardization and similarity of the component parts of the OK line enables the Oklahoma Auto Manufacturing Co. to render immediate service to OK owners. This standardization not only avoids confusion in the storeroom of the service station by eliminating any variation of makes for the different parts of the truck, but also enables the service manager to immediately determine the amount of parts on hand, allowing him to order them before a request is turned down. It is the aim of the OK company to render quick and thorough service to the satisfaction of OK owners at all times.

## OK One and a Half Ton Chassis

The OK 1½-ton truck embodies every approved feature used in conventional truck practice. The engine in this model is a 4-cylinder, heavy-duty Buda, model ITU, cast in block, of the L-head type, and has a bore and stroke of 4 x 5½ in., respectively. It has a S. A. E. rating of 25.6 hp. and is capable of developing 30 hp. at 1200 r.p.m. Controlled by an automatic governor, fully inclosed and sealed.

A three-point suspension retains this engine. It is water-cooled, including in the system a centrifugal pump with large bronze runner. The built-up OK radiator is sturdy in design and provides am-

ed pump and forced through a pipe to the main bearings. Gasoline is fed from a Stewart-Warner Vacuum tank of 18 gal. capacity, located under the driver's seat, to a Stromberg carburetor having a



Comprehensive Layout of the OK Job

11/4-in. opening and equipped with a hotair intake.

The transmission is mounted in unit with the engine, together with a multipledisk, dry-plate, of which there are 13, clutch. The clutch operates on ball bearings and is fully inclosed in the dustproof flywheel housing. This transmission, which is of the Fuller make, is of the selective type, providing three speeds forward and one reverse. Gears and shaft are of nickel steel. On the right side of the transmission is a removable cover which, when power for operating dump bodies, winches, etc., is required, can be removed for the installation of power take-off equipment. Power is transmitted from the transmission through a hollow propeller-shaft supported by a self-aligning, center ball bearing, and equipped front and 36 x 5 in. in the rear, although pneumatics may be obtained as extras if desired. The wheelbase is 150 in., the tread 56 in. and the chassis weight, less the body, 3900 lb. This job is finished in the standard OK olive drab.

The standard equipment includes seat, lamps, horn, jack, tools and tool box. The price is \$2450, f.o.b. factory, for chassis only and including the above equipment.

Inasmuch as the other two OK models follow the same lines of construction and embody practically the same made units, a satisfactory conception of what they are may be obtained from the above description. However, if definite information is desired, it may be found in the specification columns of any current issue of the COMMERCIAL CAR JOURNAL.

# The Pacific North-West Brings Forth New Models

HE H. R. L. Motor Company, 2962 S. 1st Avenue, Seattle, Wash., recently introduced a new line of trucks comprising three models, namely, R. and L. and H. As it is the contention of this company that no truck can operate continuously to capacity unless it is fitted to the work it is to perform, truck ratings are not only considered unessential, but confusing, in that they may prove to be unapplicable to a particular class of service. However, they have the following capacities: Model H. of from two to three and a half tons; model R, of from one and a half to two tons, and model L, of from three-quarter to one ton.

The initials of the three foremost offificials of the company, namely H. J. Hendricks, president; H. N. Rothweiler, vice-president, and J. A. Lagoe, treasurer, make up the name and symbol of this company. The H. R. L. line of trucks are built along lines which will most ably meet the economical transportation of freight by motor truck.

In view of the provisions made for the purchasing of materials, assembly and

factory arrangement, the company claims to be in a position to manufacture three hundred trucks this season, which quantity will be equally made up of the three models. It is the intention of this company to confine their distribution entirely in the Pacific northwest, although a few of each model will be exported to the Orient.

Much time and effort were given in the designing of the H. R. L. trucks. Such details as the type of motor, kind of springs, placing of batteries, motometer and lights, electric starter, placing of hand and foot controls and development of other features which contribute to continuous and satisfactory performance were given

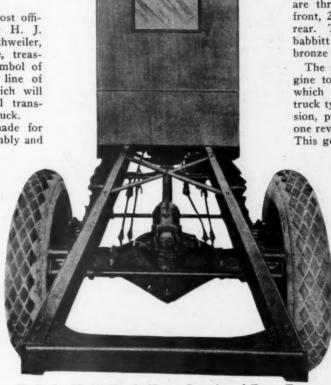
thorough trial and consideration in the final decision as to what parts should be incorporated.

The gasoline tank, which is square-riveted and soldered, tinned inside and outside, and has a capacity of twenty gallons, and an auxiliary two-gallon fool-proof emergency tank so mounted that the truck can go up a 7 per cent grade on the last pint of gasoline, is mounted in the compartment under the seat with filler accessible without removing driver's seat cushion.

Ignition is provided by a Bosch B-4 high-tension magneto with variable spark control and impulse starter. Starter and lighting is through a Gray & Davis special truck outfit, with United States Battery. The starter button is conveniently located on the dash in front of the driver.

The cooling system includes a heavy duty centrifugal pump, twenty-inch fan, and a Fedders Spirex sectional type radiator. The radiator case is of cast aluminum, with removable core formed of

round copper tubes with spiral fins and is fitted with a Boyce motometer to the left of the filler, so as to be in a direct line of vision of the driver. This location of the motometer is somewhat unique, but quite practical, as it also eliminates the possibility of its breaking, due to careless handling of the radiator cap. Both service and emergency brakes, internal expanding, covered with non-burning wire-woven brake lining, are employed. The service brake is operated by a foot pedal and the emergency by hand lever.



H. R. L., Model H. It Has a Capacity of From Two to Three and a Half Tons

Steering is through a Ross, irreversible, heavy-duty truck design with eighteeninch steering wheel.

The Hotchkiss type of drive has been adopted, as this type of drive is considered the most flexible and also tends to absorb destructive torque and road shocks. Semi-elliptic, bronze-bushed springs, made up of nine leaves in the front, measuring 42 x 91/2 in., and twelve leaves in the rear measuring 54 x 3 in. The two top leaves of the rear springs are wrapped around the spring eye. The spring bolts are hardened and ground, and are Alemite lubricated. All of the parts of the truck are very carefully fitted with bronze bushings and lubricated through self-closing cups by the Alemite pressure system. The semi-flexible frame is of pressed steel channel, six inches deep by three inches wide.

The engine is a four-cylinder Hinkley, of the heavy duty standardized military truck motor design. It is cast in block, L-head type, and has a bore and stroke of

four and five and a quarter inches, respectively. It is suspended from three points, having a trunnion on the gear case The engine speed is controlled by a Hinkley governor, which is integral with the engine and entirely inclosed. It may readily be set for maximum speed, and when locked cannot be tampered with. A force-feed system of lubrication, which includes a gear pump located in the oil pan, and under the oil-level is employed, forcing oil through drilled crankshaft to the main bearings. The bearings on the crankshaft end of the connecting rod bearings measure 21/8 x 21/4 in., and are bronze backed. The main bearings, which are three in number, are 21/8 x 21/4-in. front, 21/4 x 3-in. center, and 21/4 x 3-in. rear. These are also bronze backed and babbitt faced. The connecting rods are bronze bushed

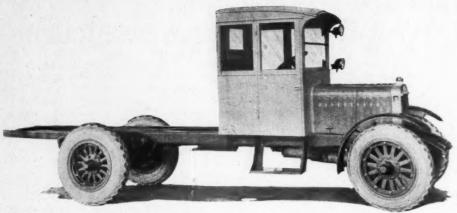
The power is transmitted from the engine to a multiple-disk, dry-plate clutch, which is entirely inclosed to a heavy truck type Brown-Lipe selective transmission, providing four speeds forward and one reverse. Direct drive on fourth speed. This gear-set provides the following gear

ratios: First, 4 to 1; second, 2.62 to 1; third, 1.5 to 1; fourth, direct, reverse, 4.8 to 1; rear axle, 9 to 1. All gears and shafts are manufactured of chrome-nickel steel, heat treated and ground to exact size. The main shafts revolve on ball bearings. The transmission is bolted securely to the motor flywheel bell housing. the transmission power is carried through a tubular single shaft three inches in diameter. which drives practically in a straight line and is fitted with two large grease-tight universal joints, to a Sheldon worm-drive, rear-axle of the David Brown type. This axle is built on the semi-floating locomotive axle principle, with wheels fixed to

the revolving load-carrying live axle. The one-piece cast-steel housing, which is built like a bridge, is considered the strongest known. The worm-gear and differential, which are mounted as a unit in a cast steel carrier which is bolted in place on the housing, permits of its easy removal and replacement without removing the housing from under the truck. Ball-bearing mountings are used throughout the wormgear unit. The drive shaft is  $3\frac{1}{2}$  per cent nickel steel forging.

Carburetion is through a Zenith autoautomatic carburetor.

Schwartz interlocking spoke, heavy duty artillery type, S. A. E. standard wheels, having fourteen two-inch spokes in each wheel, are a used. These wheels are equipped standard, with solid pressed-on tires measuring  $36 \times 4$  in. single in the front and  $36 \times 4$  in. dual in the rear. However, pneumatics, if desired, are provided at extra cost, and are  $36 \times 6$  in. in the front and  $40 \times 8$  in. in the rear.



Every Unit is Assembled to Make for a Sturdy and Accessible Job

The thread is fifty-six inches, front; sixty inches, rear, if equipped with solid tires, and fifty-six inches front, fifty-eight inches rear, if pneumatic equipped. The turning radius of the one hundred and fifty-four wheel-base job is thirty feet.

Weight of chassis and cab, 5310 pounds.

This truck is standardly equipped with coupe cab, kerosene tail lamp, Prest-O-Lite gas tank, two head lamps, speedometer, Buell whistle, oil can, heavy duty jack and tools.

## Keystone Builds Service Truck for Overland "4" Dealers

NEW service truck designed especially for Overland 4 dealers, for use in rendering service to owners of the Overland 4 car under all conditions, is being manufactured by the Keystone Motor Truck Corp., 42nd & Chestnut Sts., Philadelphia, Pa. This truck, chassis and body, was constructed to accommodate the carrying and convenient placing of a complete line of all the special tools necessary for an emergency service truck. The completed job is distinctively finished with a black body and ivory striping and wheels and running gears of cream; and the conspicuously painted emblem of the Overland 4 on both sides of the curtain also assist in making this service truck, once it has become known from extensive use, immediately recognizable as identified with the Overland 4 passenger car, thereby serving a double purpose of a service truck and a traveling advertising medium.

The body has a canopy top, which is equipped with side curtains and rear curtains which when dropped completely encloses the interior of the body. The cab is of the all-weather type, having removable doors and a glass windshield fixed in a wood frame, the lower half of which is permanently fixed. If the doors are still in place and ventilation is desired, the left-hand window can be swung up and hung from the roof. The curtain at the back of the cab is also detachable. The truck is equipped with a spring cushion, the towing hook working through the rear cross member of the chassis. Emergency equipment is stored in a large tool box on the right side.

This pneumatic equipped 1-ton truck has a 4-cylinder L-head type engine with poppet valves on the right side, cast in block, removable head, and is suspended from four points. It has a bore and stroke of 33% and 4 in., respectively. It is rated

at 18 hp. and the maximum driving speed is 25 m.p.h. The force feed and splash system of lubrication to the bearings is employed. The crankshaft revolves in three main bearings. A cellular radiator is incorporated in the thermo-syphon system of cooling. Ignition is by battery, induction coil and distributor, and starting and lighting is provided by the Auto-Lite two-unit, 6-volt system. A 10-gal. gasoline tank placed under the cowl, feeds fuel to a ¾-in. special Tillotson carburetor, having a hot air adjustment and a stove over the exhaust manifold.

The power from the engine is transmitted through a single-plate clutch of the floating ring type which is 8 in. in diam. and operates in oil, to a selective type transmission, which provides three speeds forward and one reverse. This entire assembly is built in unit with the engine. Final drive is through an internal gear rear axle with a gear ratio of 7.7.:1.

The service brakes which are actuated by a foot pedal contact on a 14-in. diam. drum, 21/2 in. wide, and the hand emergency internal expanding brake is 334 in. wide. The front axle is a drop forging of the conventional I-beam construction and has a clearance of 13 in. The rear axle clearance is 121/2 in. The frame which is of 5 x 2 x 3-16 in. pressed steel channel and well braced, is carried on threepoint cantilever suspension springs in the front and semi-elliptic springs consisting of 11 leaves and measure 52 x 11 in. in the rear. The steering gear which is of the planetary type mounted on the left side has a 16-in. handwheel. The artillery wood wheels equipped with demountable steel rim on which tires, measuring 31 x 4 in. in the front and 33 x 5 in. Fisk cord pneumatics in the rear, are mounted.

The wheelbase of this truck is 126 in., the tread is standard. The minimum turning radius is 41 ft. 8 in. The equipment includes headlight with dimmer, dash and tail lights connected in series, tail light mounted in combination with the license plate bracket, magnetic speedometer, ammeter, horn, extra rim, tools, tire repair kit, jack and pump.

Price complete with cab and body is \$1675, f.o.b. Philadelphia, Pa.

Books As Tools is the suggestive and timely subject of a circular issued by the American Library Association, 24 West 39th St., New York. Quality rather than quantity must stabilize "Made in America" goods in the markets of the world. How shall the manufacturer obtain thoroughly capable employees? How shall the employee acquire his knowledge? The answer is-books. Many far-seeing manufacturers and executive heads have installed special libraries of technical books, and from them the worker may obtain the most minute information upon the industry he is in. These libraries have met with the greatest favor on the part of both employer and workman. The American Library Association, organized 44 years ago, will raise a fund of \$2,000,-000 to carry out an enlarged program, including the larger use of technical books in public libraries, and in factories and industrial plants.



Fully Equipped Overland "4" Service Car Made by the Keystone Motor Truck Corp., Philadelphia, Pa.

## The Franklin One Ton Air-Cooled Truck to be Announced Shortly

HE motor truck department of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., announces that the designs and drawings for the new one-ton Franklin truck are practically completed. This job will embody many of the features which have distinguished the Franklin car. Among the most prominent being the air-cooling system and the wood frame. It will be fitted with pneumatic tires, making it adaptable for farm-land service; negotiating not only over the country highways but the farm lands as well, a feature that will especially appeal to the farmer. Of the thousand and one uses to which a truck can be put successfully, the fact that one-third of the one-ton trucks made are sold to farmers, is well borne in mind by this company. The farmers' general requirements may be divided into two general classes: First, hauling on the road; second, hauling on the farm. On most farms where trucks are used, the actual hauling on the farm itself constitutes one of the greater number of uses for a truck. Some of the fundamental requirements for this type of service is light weight, flexible construction and freedom from engine-cooling troubles, details are being taken thoroughlyl into consideration by the engineers of the new Franklin truck.

The power plant, which will have a long stroke and four cylinders, is designed especially for truck purposes and large bearings and liberal wearing surfaces, lubricated constantly by a circulating oiling system are provided. This engine will be in unit with the transmission. The power transmission provides three speeds forward and one reverse.

Special attention has also been given to all the units, such as front and rear axles and other parts, in view of having as few parts as possible and making them as accessible as possible. The front axle is of the built-up Franklin type, constructed almost entirely of nickel steel, heat-treated, and is light in weight. Spiral bevel gears are used in the rear axle for final drive. This axle weighs approxi-mately one hundred and seventy-five pounds. A new locking type of differential is used, which will always permit of the power being transmitted to the wheel which has traction.

The braking system is different from the conventional method, the service brake being on the transmission. It is said to be capable of holding or stopping the truck under all conditions.

As the universal joints are made of flexible fabric, lubrication of the universal joints is eliminated entirely. This joint is also said to be free from rattles.

No grease cups will be found on the Franklin truck chassis, and all spring pins and front axles are lubricated by wicks from oil reservoirs that require refilling only every three thousand to five thousand miles. The chassis oiling-system holds about one quart of oil, and can be replenished in a very short time. This system insures attention to this detail, which is often neglected when grease cups

A variety of bodies such as express, panel, stake and a convertible type, especially suitable for the farmers' need, will be built by this company.

Other details given consideration are the electric starting and lighting system, accessible controls, and comfortable seating for driver. A weather-proof all-season cab will also be furnished as regular equipment.

The end-gate, when lowered, is level with the platform and is supported on each side by a chain. On the side panels are mounted 5-in. flareboards. This body is carried on 11/2-in. six-leaf platform springs mounted on a 13%-in. axle.

Artillery wheels of the Ford type are furnished with 3-in. clincher pneumatic tires and revolve on ball bearings. The entire job is painted black and weighs 400 lbs. packed for shipment. The capacity of this 2-wheeled pneumatic-tired trailer, is 1000 lb.

To meet the demand for trailers to carry heavy loads, and to be operated in connection with an automobile or truck, this company has recently brought out a four-wheeled, 1-ton trailer, known as the Wolverine. The body of this trailer measures 38 x 120 in., with 10-in. panels and 5-in. flareboards. The artillery wheels are furnished with 3-in. pneumatic tires or 2-in, solid rubber tires. The wheels revolve on Timken roller bearings.

The shipping weight is approximately 800 lb. The price of this trailer equipped with pneumatic tires is \$185, or, with 2-in. solid rubber tires, \$175, f.o.b. Brown City,

## Against Compulsory Metric Legislation

NEW YORK, April 20 .- A recent largely attended convention of the American Railway Engineering Association, with an overwhelming and applauded standing vote "in convention assembled expresses its opposition to the adoption of the metric system of weights and measures to the exclusion of the English system or the American system at present in general use."

At a meeting of the Executive Board of the N. A. C. C. a resolution was adopted: "Whereas a canvass of motor car manufacturers, members of this organization, has failed to develop that any of them are in favor of such legislation owing particularly to the difficulty at this time of changing dies, factory equipment and mechanism and the great cost of same; also the confusion that would be created among workmen who have not been educated in the metric system, be it

"Resolved, that this board is opposed to legislation making the use of the metric system of weights and measures obligatory, and recommends that members of the N. A. C. C. lend their support to the American Institute of Weights and Measures, which is actively opposing this movement."

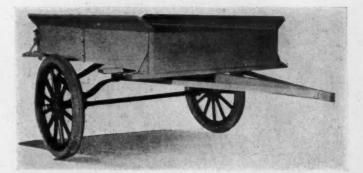
# Brown City Trailers

City, Mich., are offering to the trade two-wheeled pneumatictired trailers and four-wheeled pneumatic-equipped one-ton trailers with various types of bodies.

The most important feature in the construction of the two-wheel trailer is that the wheels, bearings, rims and tires are interchangeable with the front wheel equipment on Ford cars. This insures the

HE Brown City Mfg. Co., Brown owner a quick and economical supply of parts always on hand at the nearest Ford dealer. The trailer is easily attached to a Ford car by the use of a special designed swivel hitch which is attached to the rear springs and cross member of the machine. The standard body measures 42 x 72 in. inside with 10 in. panels.





The Entire Wheel Unit of Brown City Trailers is Interchangeable With the Front Wheel Equipment on Ford Cars

## The Trailer Truck is Especially Designed for Lumber Transportation

N addition to the known fact that the use of a trailer will double the transporting capacity of a truck, the Trailer-Truck, manufactured by the Trailer Truck Co., of Nashotah, Wis., is featured by distinctive loading and unloading devices designed to facilitate the rapid handling of lumber and other allied products such as logs, pipe, piling and steel. The Trailer-

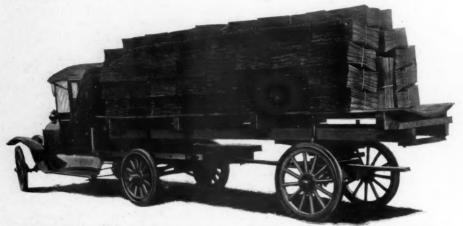
which the drawbar is directly connected and not to the top of the spring. The proportioning of the weight of the load in accordance to the capacity of truck used can also be made by adjustment. If a light truck is used the heaviest part of the load can be transferred to the trailer. If at any time the truck is required for the handling of light loads or short materials the truck platform can be quickly cleared

ous styles of bolsters to accommodate special work, although plain standard width bolsters, adjustable chain logging bolsters, trailer-truck roll-off bolster, or 60-in. loose stake bolster can be obtained.

The chain block logging type bolster permits of the tight bunking of one log or a half dozen, as the bunk blocks are adjustable and can be locked to any point on the bolster. When not in use these bunk blocks drop over the ends of the bolster leaving the top entirely free and flat.

The trailer-truck roll-off is especially designed for lumber. With it loads of lumber can be discharged in a unit and the time consumed in this operation is said not to exceed five minutes.

The rolling fifth wheel designed by this company is said to entirely eliminate the shortening and lengthening of distance between the Trailer-Truck bolster and the bolster mounted on the truck platform when making a sharp turn or going over uneven ground. It allows cinching of the load to both bolsters. This wheel, which can also be easily removed from the truck, is built in three models designed to take care of capacities ranging from 6000 to 20.000 lb.



Model C Trailer-Truck With Smith Form-a-Truck, Showing the Adaptability of This Unit to Any Style of Rack for the Handling of Bulky Materials

Truck line, which consists of five models, is designed to carry capacities from two to five tons. They are not only built to conform with the height of the truck with which they are attached, but are also adjustable as to length, permitting the hauling of all materials regardless of their length. This adjustable feature also permits the transferring of any type of rack, box or platform from a wagon or other vehicle to the truck and trailer-truck.

The possibility of distorting the trailer assembly is said to be obviated as the drawing power is exerted at the axle to by pulling out the draw pin and lifting the bolster and center roll from the center platform.

The entire line of trailer-trucks are constructed along the same lines. The wheels are of second growth hickory, solid rubber truck tires. The wheel bearings are Timken roller and springs are special heat treated and oil tempered steel. The springs are also of steel and the drawbar which is in one piece, is either 8 or 10 in. steel bound and adjustable to various dimensions, in accordance to its capacity. These trailers are built with vari-

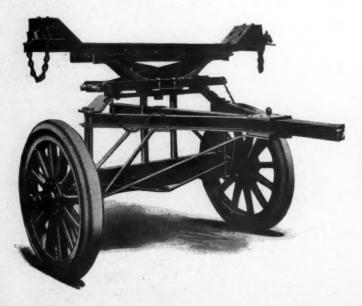
## Revised Road Code Vital to Truck Transportation

E. A. Williams, Jr., president of the Garford Truck Co., believes that despite the magnitude of the good roads movement, which has been one of the greatest institutional developments of the last decade, it has not kept pace with the growth of motor transportation as a unit in America's commercial system.

Unless, in Mr. Williams' opinion, something is done to assure more construction of roads of the type adaptable to general use instead of restricted traffic the full possibilities of truck transportation cannot be realized. This realization cannot come for several years, unless a revision is made in road building codes.

Unless the highways, particularly intercity highways, are made ready for trucking operations it will mean the loss of millions of dollars and cause serious injury to domestic commerce in the near future because of the necessity of rebuilding to suit truck traffic. Business men will demand the rebuilding as they begin to realize more fully the vital part played by the truck in the transportation field.

Business has been so thoroughly convinced of the value of the truck and its use that it has forgotten the necessity of value in roads, Mr. Williams said. Something must be done now to stimulate interest in proper roads to carry the traffic that is expected of them.



Showing the Model C-2 Trailer-Truck With Adjustable Chain Block Clogging Tight Bolster.

# TRUCK EQUIPMENT AND APPLIANCES











# Engine and Complete Power Plant Products of the Matthews Engineering Company

FOUR-CYLINDER engine for truck and tractor service, and a power plant, complete with engine fuel lines and radiator and power take-off, both of which are gasoline driven power units, are being manufactured by the Matthews Engineering Company, Sandusky, Ohio. The engine is an overhead valve type with a bore and stroke of  $3\frac{1}{2} \times 5$  in., respectively. The four vertical cylinders are cast in block with the upper half of the upper half of the crank case. Valves and rocker arms are inclosed. The lower section of the crank case is a steel stamping. The cylinder head is detachable. The engine, including the bell housing, weighs four hundred and forty pounds.

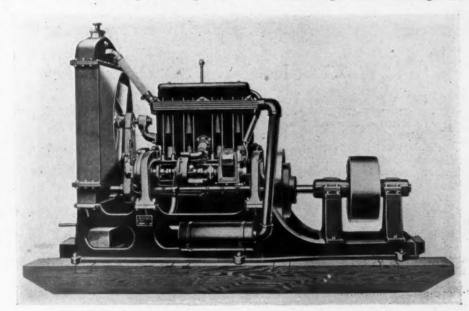
The cylinders are offset three-eighth inch from the center of the crankshaft. Each has three eccentric rings. The crankshaft is drop-forged steel. The connecting rods are .40 carbon steel drop forgings. The camshaft is .20 carbon steel drop forged, with the cams integral. The crankshaft rotates on three large bearings provided with oil grooves to insure proper lubrication. The diameter is seven-eighth inch.

The valve heads, which are one and nine-sixteenth inches in diameter, are alloy steel, and are welded to carbon steel stems. These valves are interchangeable, being adapted for exhaust and intake alike. The mushroom lifters are offset slightly from the cams. The arms are dropforged and are bushed with bronze. The

crankshaft and intermediate gears are steel, and the camshaft gear is cast iron. The teeth of these gears are helically cut at an angle of twenty-four degrees.

The main and crankpin bearings are

Front, two and three-quarter inches; center, two inches; rear, three and a quarter inches. The crankpin bearings are one and three-quarter inches diameter and two inches long. These bearings are



Matthews Complete Stationary Power Plant Includes a Water-Cooling System, Stewart-Warner Vacuum Feed and Power Pulley

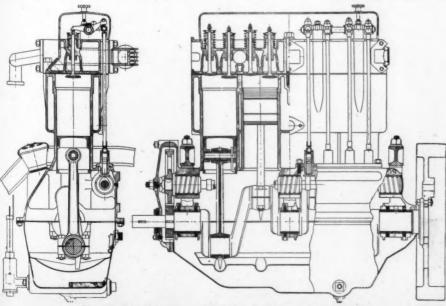
bronzed-backed, Fahrig metal lined. The diameter of the main bearings is two inches throughout, and the lengths are:

adjustable and interchangeable, and are held by brass-retaining screws. The camshaft bearings are bronze, with a total length of seven inches.

Lubricating oil is forced through the sump through a strainer into constant level troughs under the connecting rods. The pump is driven at engine speed from the accessory shaft, and is mounted in an accessible position on the gear cover. Scoops on the ends of the connecting rods splash the oil to the working parts. The pump also delivers a stream of oil to the timing gears. The capacity of the oiling system is six gallons. All oil leads are external and a float indicator is provided.

The engine is designed for thermosyphon cooling, but there are times when it may be advisable to use a pump. Under these conditions a bronze centrifugal pump is mounted on the left side and driven from the accessory shaft. The magneto is then driven from the pump

Ignition is provided by a high-tension magneto driven from the accessory shaft. It is fitted with a Vernier adjustment coupling. The seven-eighth-inch spark



Mechanical Details of Matthews Heavy-Duty Engine

plugs are fitted into the cylinder head at an angle of forty-five degrees.

At 1000 r.p.m. the engine is said to develop twenty-one brake horsepower.

## Engine Used in Power Plant

The Matthews model F engine is built with a suspension of either three or four points. The four-point suspension from the support arms enables the engine to be adapted to various commercial uses besides chassis service. This design is used in the model MF power plant by the same company. The horsepower is rated at sixteen when used continuously in stationary work. This power plant is made by mounting two pillow blocks, a one five-sixteenth-inch shaft and a split pulley on an iron base and in line with the crankshaft of the engine. The shafts are connected by a Thermoid flexible coupling.

The plant is mounted on 6 x 6-inch skids, and the weight of the complete unit, uncrated, is 1250 pounds.

A Stewart-Warner vacuum tank on the carburetor side of the engine is regular equipment. The large tank is not provided regularly.

The radiator has cast-iron tanks and sides, with a shroud for the fan. It is said that this radiator is the type used on the four-ton truck by the Government. The core is the fin-and-tube type. The circulating water pump handles eleven gallons of water a minute. There is a drain at the bottom of the entire cooling system.

A muffler is furnished, but not piping. The height overall is fifty-three inches; length, seventy-two and a half inches without skids, and eighty-four and a quarter inches with skids. The price, f. o. b. Sandusky, is \$585 in carload lots.

the top of the distributing shaft. The distributor cap has as many thimbleshaped inserts as there are engine cylinders to be supplied with sparks, plus the center one, which is connected with the coil. The bakelite compound is forced around these inserts into the shape of high necks above the top of the cap, so that the cap is one solid piece, and has no joints at the bottom of the necks to admit moisture and cause grounds. The top of the cap is crowned to shed moisture, and a drip mold is also provided for the same purpose. The center contact is a graphite ball spun into a recess in its metal insert. A steel brush on the distributor arm presses continuously against this contact, the spark jumping from the end of the distributor arm to the engine cylinder inserts in the proper order. The clips can be applied quickly without solder, and can be removed and used again without difficulty.

# New Westinghouse Ignition

HE Westinghouse Electric Co., Pittsburgh, Pa., has recently announced a new ignition system known as Model F-C. Included in the many improvements in the designing and the construction of this new product is an indestructible condenser, a self-lubricating cam, a coil, and breaker that requires but little attention. It is of the non-automatic, closed circuit, two-unit type, and is suitable for 6 and 12-volt batteries and 4, 6 and 8-cylinder engines. It can be supplied for generator or engine drive, and a magneto replacement is also furnished. The distributor head consists of a base, which holds the condenser and breaker mechanism, and a cap, which carries the high tension contacts. The baked-on enamel, cast iron plates are provided with small openings to permit the gas created by the spark to pass off.

Fibre Retaining Piece

Termina

Movable

Stationary Contact

wiping action, which keeps the surface clean and free from pitting. The contact points are of pure tungsten. The cam is made of a compound of graphite mixed with bakelite, which is moulded under heat and high pressure. This composition is said to eliminate the necessity of lubrication.



Breaker Mechanism in the New Westinghouse Ignition System.

Oil Hole

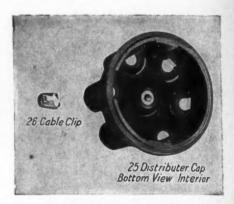
Cover

Distributor Brush

The breaker mechanism consists of two arms, one stationary and the other moved by the cam. Each arm carries a contact, and the movable arm of special shape, when operated by the cam, causes the contacts to open and close with a

Cam

The condenser is encased in a tinned steel box with a close-fitting cover wipedsoldered to the box and the lead wire is heavily insulated at the point where it leaves the box. The distributor arm is mounted on a bakelite block, carried on



Cap Which Carries the High-Tension Contacts

The coil has highly insulated balanced windings which are encased in a micarta tube, with an insulating compound of high melting point poured in to exclude moisture. The mounting base is of steel, and the cap is of special vitreous porcelain, baked in insulating enamel. The distributor base casting is made of magnalium and the various parts are copper and nickel plated and hand buffed. Two spark equipments furnished in this type.

## Dry Powder Fire Extinguisher

An ever ready and convenient fire extinguisher in the form of a dry powder chemical that will not freeze, evaporate, corrode, explode or deteriorate, put up in tubes, is the product of the Silver Mfg. Co., Waterloo, Iowa.

This fire exterminating material conveniently put up in tubes, is placed on a strong hook at some accessible point on the wall of the garage and in the event of a fire it is jerked from its hook. The jerking action in removing causes the tube to open automatically and then it is evenly distributed over the base of the fire by a swinging motion. The heat reacts with the powder, converting it into a gas which promptly smothers the fire. It is not injurious to the skin or to fabrics, making it safe and simple to handle. The retail price is \$2.

### Continental Truck and Trailer Axle

Front truck axles and dead trailer axles made in various models for different capacities make up the products of the Continental Axle Co., Egerton, Wis.

The ball pin of the front axle turns over the bed of the axle and permits of connections for either fore or aft steer. Steering connections are also provided for cross steer. The wheel spokes are secured in malleable iron hubs which have seven holes in their flanges provided with nuts and bolts by which seven of the fourteen spokes are secured. The wheels

ment of the co-operative efforts of both the Oakes and Timken engineering departments.

The blade and pulley construction follows the regular lines of all Oakes models. The function of the Timken tapered roller bearings is to take the radial and end-thrust loads encountered in the hard, high speed service to which a cooling fan is subjected.

Other features claimed for this fan bearing installation are that it requires no elaborate or expensive mounting, and that it is capable of great endurance, because of the ease and simplicity with which roller bearings may be adjusted.

Oakes Radi-

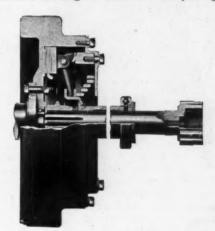
ator - Cooling Fan Equipped With Timken

Roller Bear-

### Improved Hoosier Clutch

The Hoosier Auto Parts Co., Muncie, Ind., manufacturers of the well known single-plate dry-disc Hoosier clutch, has added several worthy improvements to its product. The clutch is made in both the unit power plant type and the amidships type. It is mechanically interchangeable as a unit with other clutches similar in design and is made in three sizes.

The elimination of the inner bearing and the substitution of a spherical seat and the release sleeve, which provides for self-alignment of the clutch and clamping levers at all times, represents one of the recent improvements. Another improvement is the angular seat on the adjusting



Improved Hoosier Single-Plate Dry-Disc Clutch

ring, against which the radial nose of the clamping levers bear. The cover has also been improved in design. The adjusting ring is now threaded into the cover counterbore, instead of on the inner flange of the cover as previously.

Vulca Patch

143 Second St., San Francisco, Cal., is the

Vulca Patch, a rubber material guaran-

teed to permanently make repairs on

blowouts. It is not only compounded to

resist high pressure, hot roads and hard

service, but is also claimed not to shift or

creep under the most adverse road

conditions.

A product of the Vulca Laboratories,

### Continental Front Axle for Trucks

revolve on Timken standard roller bearings, Bock, Bower and Wright.

The spindles and arms are of forged, heat treated alloy steel and the clevises are drop-forged steel with bronze bushings in the yoke. The clevis pins, pivot bolts and ball pins are made from high quality, low nickel chrome steel carbonized, hardened and ground to size.

The forged carbon steel beds with ball bearings in the yoke are so arranged to take both the radial and thrust rods. All bearing surfaces are lubricated by liberal

sized grease cups.



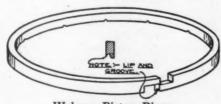
Square Beam, Dead Trailer Axle

The following are specifications of the model 1901 truck axle which has a capacity of 3000 lb, and inasmuch as this model is entirely similar to the other models in construction, the specifications of the other models vary only in accordance to the difference in capacities. This model has a standard track of 56 in. The maximum spring center is 311/2 in. and minimum 29 in. The spring width is 21/2 in. The Ibeam section measures 234 x 2 7-16 in. The outside diam, of the spindle is 1 3-16 in. and the inside diam. 134 in. The spokes have a bore of 334 in. and are 11/2 to 2 in. in width.

Model 18-40 dead trailer axle has a capacity of 3000 lb., standard track 581/4 in.; spring width 21/2in. The square beam section is 2 x 2 in. The outside diam. of the spindle is 13% in. and the inside diam. 2 in. The spokes have a bore of 11/8 in. and are 134 to 2 in. wide.

The maker of the Anti-Oil Leak Piston Rings claims that the rings conform automatically to worn cylinders. Another feature of this ring is the fact that it permits all excess oil to be forced back into the crankcase. This is made possible by the knife edge lip and groove, which gathers the oil, and outlet passages at the

The Welever Piston Ring



Welever Piston Rings Tends to reduce the admission of oil in the combustion chamber

bottom of the ring to allow the oil to pass through holes in the seat of the ring groove of the piston.

The rings retail at \$1.25 each, subject to discount to dealers, garage men and repair shops. A special discount is extended for shipments of 100 to 500 lots. The manufacturer is the Welever Piston Ring Co., 113-19 Superior St., Toledo, O.

This blowout repairing material is said to be particularly useful for repairs or blowouts, such as, 24-in. rips, torn valve stem sections, torn tubes, etc. It is applied cool and the only tool required is a knife or a pair of shears to cut the required size.

Vulca Patch may be obtained in large cans containing 108 sq. in. for \$1.75, an intermediate size can containing 54 sq. in. for \$1, and miniature size cans containing 221/2 sq. in. for 50c.

### Oakes Announces Timken-Equipped Radiator Fan

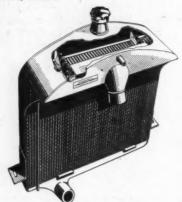
The Oakes Co., Indianapolis, Ind., builders of radiator cooling fans for cars, trucks and tractors, has just announced a new model radiator fan in which Timken bearings are used as standard equipment.

This new model, which is now ready for quantity production, is the developThe Challoner Co. and the Giant Grip Horse Shoe Co. are now combined and will do business under the name of the Giant Grip Mfg. Co., at Oshkosh, Wis. H. B. Osgood is manager.

The Duplex Engine Governor Co., Inc., Brooklyn, N. Y., at a recent meeting of the board of directors, elected Oscar Mautner as secretary and general manager. For several years he has been secretary and assistant treasurer. J. Parke Channing succeeds the late Mr. Douglas as president of the new company, and Wait Talcott succeeds Mr. Channing as vice-president.

### Thermostatic-Controlled Ford Radiator

Such conditions as overheating or freezing or possibility of overcooling, is said to be entirely eliminated in the new thermostatic control Ford radiator recently placed on the market by the Curran-Detroit Radiator Co., 558-70 Lafayette Bldg., Detroit, Mich.



Cutaway View, Showing the Direction of the Controlled Circulation

The thermostatic control, which is a simple self-adjusting device regulates the quantity of water to be circulated, automatically, in accordance to the need. An even running temperature of about 170 deg. is said to be maintained by the utilization of this device, winter or summer. In addition to the thermostatic control, the core of the radiator is so constructed that the air passes through it at an angle of 30 deg. This is another exclusive feature. A great increase in cooling power is said to result from this angle of air strike plus the increased air pressure.

### Blue Ribbon Transmission Band Linings

The line of Blue Ribbon transmission band linings, produced by the Right Motor Specialties Co., 1326 Michigan Ave., Chicago, Ill., is said to eliminate chattering and slippage of the brakes.

This lining is a composition made up of tough cotton belting in the center of which is a strip of natural sheet cork, the



The Composition of This Brake Lining is Such as to Eliminate, Hardening and Chattering

object of this cork being, to prevent the cotton lining from becoming hardened under the influence of heat and oil. It also acts as a cushion increasing the flexible life of the lining.

The lining is put up in sets of three, furnished with the necessary brass rivets and sells for \$2.50 per set.

### Shotwell Storage Tank

A cylindrical tank made of galvanized steel for the carrying of gasoline or oils is the product of the Shotwell Pump & Tank Co., Boston, Mass. The tanks are finished with two coats of rust resisting metal paint. This tank is provided with a gage which enables the operator to ascertain the quantity of gasoline in the tank and the amount delivered at any time. The hand-operated pump consists of a vertical plunger that reciprocates in a cylinder, both of which are made of brass. The plunger has a cast steel head and base. This pump also includes a lock and a discharge nozzle with a quick acting lever for shutting off. It stands



Shotwell Storage Tank

This outfit is designed for owners of trucks, cars, etc, and consists of underground tank, non-measuring pump with lock, and discharge nozzle with quick-acting lever.

28 in. high and occupies a floor space of 10 sq. in. The gasoline hose and portable nozzle are furnished as extra.

The standard outfit includes the pump and underground tank. The underground tank has a capacity of from 55 to 1000 gal. and is equipped with foot valve, filler pipe, and inner tube of galvanized steel inside of the filler pipe, which carries the gasoline when filling the tank in an uninterrupted stream directly to the bottom, thereby preventing splashing and vaporization. A double cast iron filler pipe cap is provided with the vent. Foreign substances are prevented from gaining entrance by a cone shaped strainer which is provided on the inside of the inner tube.

### Correction

On page 33 of the April issue of the "Commercial Car Journal," the address of the American Wagon Co., manufacturers of the 8 in 1 convertible line of truck bodies was given as Jackson, Ill. This address is incorrect. It is Dixon, Ill.

### Wolke Red Cap Battery

The battery plates of the Wolke Red Cap Battery, made by the Wolke Lead Battery Co., Louisville, Ky., and which are guaranteed for two years, are made by a special process designed to insure long life to the active material on the plates. The reinforced staggered horizontal bars of the grid is another feature.



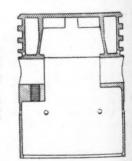
Three-Cell Wolke Battery

All foreign substances are removed from the California cedar separators by an electro-chemical process. This process also renders them uniformly porous. The hard rubber jars are molded unusually heavy and the battery boxes are dovetailed and additionally reinforced with dowel pins which effectually prevent the joints from spreading.

### Loechin-Loehr Lubricating Piston

A new idea in cylinder wall lubrication has been advanced by the Loechin-Loehr Lubricating Piston Co., 220 Cedar St., Green Bay, Wis., in its new piston which is said to satisfactorily meet the requirements necessary to obtain adequate lubrication. This piston is equipped with an oil reservoir, which is automatically filled by the splash caused by the piston rod dipping into the oil sump. This collected oil passes out through a series of small openings to and between the rubbing surfaces of the wall and piston, thus creating

Cross Section,
Showing Oil
Chamber
Above Wrist
Pin Bearing.
The oil percolates
through numerous
openings to the
sliding surfaces.



a constant lubricating film. The oil contained in the reservoir also acts as a "collan," thereby preventing undue expansion of the piston head. In view of this cooling condition it is stated that the pistons can be fitted much closer than is usually possible, thereby eliminating much trouble similar to that incurred by loose fits.

The price of this piston is \$6.



### SERVICE AND REPAIR DEPARTMENTS



Conducted by C. P. SHATTUCK

### The One-Man Shop vs. the Large Service Station

How the Mechanic Can be Educated to Take an Interest in the Business

HY is it that the small repair shop is successful and satisfying to the customer whereas upon expansion complaints and "come backs" develop? And is it possible to apply the successful methods of the one or two-man shop to a large service station? Thomas G. Gluck, service manager of the White Motors Co., New Haven, Conn., answers both questions. To the first he says that the principal reason for the success of the small shop is due to the personal contact be-

tween the customer and the shop owner-mechanic. Gluck ought to know for previous to his present connection he conducted a small and very successful shop from the service standpoint.

"Yes, much of the success of the small shop is due to the customer's personal contact with the mechanic, at least that is my experience. For example. A customer comes to the one-man shop with his truck or car and is experiencing trouble with it. He thinks that a certain unit is not functioning properly. There may be other units equally or more so at fault but the customer wants the part fixed which HE KNOWS IS NOT RIGHT. Eliminate the trouble in an efficient manner, do a first class job, and the customer is satisfied that he has been given service.

"After satisfying him he can be sold on having other needed work done, but I do not believe it good business to attempt to divert the customer's mind from his original complaint by telling him that

other repairs are more important although they may be. And, it is equally important to know what the trouble is before starting work on it and to be honest and truthful with the customer. The one-man shop is successful and satisfying to the customer because the MECHANIC-OWNER HAS AN INCENTIVE TO PRODUCE 100 PER CENT WORK. He takes pains to see that every operation is carefully performed, that every nut and bolt is tight and every cotter pin in place and locked. He first satisfies him-

self that the work is right, then the customer by riding with him in the car. THE MECHANIC-OWNER HAS AN INCENTIVE TO PRODUCE BECAUSE A COME BACK MEANS A LOSS BOTH IN TIME AND AN UNSATISFIED CUSTOMER."

Mr. Gluck believes it possible to obtain that efficiency and success of the small shop with a large service station, and while he has not solved many of the problems of the big repair shop he is making progress. Less than a year ago he was

tendered the offer to take charge of the service and repair shop of the White Motors Co., which, by the way, has been selling White trucks for nearly 11 years and representing passenger cars as well. The decision of the officers of the company to develop its service to the highest possible point was due to the increasing number of White trucks to be serviced and to the realization that THE SUC-CESSFUL TRUCK DEALER OF THE FUTURE WOULD BE THE DEALER WHO RENDERED SERVICE THAT SATISFIES.

Mr. Gluck was not an executive when he accepted the position. He was, as he told the writer, just a mechanic who had conducted a successful small shop and who had made a careful study of the service problems. And he has ideas - barrels of them. And some day he hopes to give them the acid test. He and the officials of the company are sold on the idea of applying the one-man shop principles to the service station.

### The Service Policy

1. All motor vehicles distributed by us will be inspected upon request of the owner, at our Service Station. This inspection is made without cost to the owner, during the life of the vehicle, provided such inspection is made at our Service Station during regular working hours.

2. We will make all necessary adjustments for one month after delivery of the motor vehicle without cost to the owner provided it is

2. We will make all necessary adjustments for one month after delivery of the motor vehicle without cost to the owner, provided it is brought to our Service Station for that purpose and has not been tampered with or injured through accident or neglect. After that time all work will be done in a careful and workmanlike manner at our regular rates for such work, except as noted in Clause 3.

rates for such work, except as noted in Clause 3.

3. We will install at our Service Station without cost to an owner either for labor, parts or transportation, any parts that may be replaced by the manufacturer of the motor vehicle under the warranty of the manufacturer for a period of ninety days after delivery of the motor vehicle to the purchaser, who assumes the cost of parts and installation of same, pending factory decision.

of same, pending factory decision.

4. The owner, who has had parts sent to the factory with claim for credit, will be notified promptly of the decision of the factory regarding allowance of such claim for replacement or repair of parts returned.

5. All gratis work under the manufacturer's warranty is to be done at our Service Station, and in the event an owner requests warranty work to be done at a distance from our Service Station the expense of the workman for transportation, board and lodging, if any, will be paid for by the owner.

will be paid for by the owner.

6. If, at the time of inspection, or when warranty work is being done, we are called upon to do ordinary repair work which does not come under the warranty, the labor and material required for such repair work will be payable for at our regular rates.

7. When driving or general instructions incidental to the care of a vehicle are necessary, we agree to teach, without cost, one person. Any instructions desired by anyone else will be payable for at our regular rates.

8. It is understood that inspections and instructions concerning the operation and care of the motor vehicle, though made by our employees, are in fact made on behalf of the owner and that the inspector or instructor is acting for him. The owner, therefore, waives all claims arising out of any fault or omission therewith.

9. It is our intention to give each and every purchaser of a vehicle sold by us fair and business-like treatment. Should any patron not receive it, we ask in good faith to be so advised.

THE WHITE MOTORS COMPANY Effective January 1, 1920 They believe that the old conditions under which the mechanics labor will not be applicable a few years hence, that to meet the competition in merchandising highway transportation in the future will not only require a sound organization and stable policies, but that all employees, from the sweeper to the chief executive must co-operate. Only through co-operation can waste effort, time and money be eliminated.

Having been a mechanic and associated with the wage earner Mr. Gluck understands the mechanic's point of view, believes he knows how to disarm his foolish suspicions, how to enlist his co-operation and instill loyalty into the organization. If loyalty is possible in the small shop where the mechanic-owner is assisted by another workman is it not possible to educate the mechanic in the big shop to a point where self interest will make him efficient in his work and make him see to it that his fellow workmen are equally as interested?

One of the first steps of the new service manager at the White Motors Co. was to organize the different departments, the

parts or stock room, mechanical, electrical, testing, etc. Mr. Gluck let it be known that his policy in selecting departmental heads was to take men from the ranks, not go outside. And the men selected were not always what might be highly trained or skilled. Loyalty to the organization, self interest in their work and ambition were factors considered. If the man selected for a certain position lacked complete knowledge Mr. Gluck taught him. In other words, his policy is to develop. Having selected his men his next step was to take them into his confidence, to sell them the fundamentals of the one-man shop. After giving over a department to a workman Mr. Gluck does not wear out shoe leather or waste energy attending to the details of that department. He has not the foolish idea that some executives have that the department cannot run successfully unless he supervises every lit-

tle detail. He trusts to their judgment. Of course mistakes occur but if the departmental head makes them they profit by them.

Members of the various departments are encouraged to make suggestions that will better service, cut down time in operations through time and labor saving equipment, and complaints receive equally as careful consideration. The conventional suggestion and complaint box is employed and if the writer of the note does not care to sign his name the suggestion or complaint is given the same consideration as a signed one. number of practical and valuable suggestions have been made and one of the more recent ones was the suggestion of a mechanic that a dumb

waiter be installed to connect the ground service floor with the repair shop and making use of the waiter for the testers' cards, requisitions, etc., which saves considerable time formerly spent running up and down the stairs or using the elevator.

### Mechanics Attend Weekly Sales Meetings

One of the steps taken to interest the mechanic in his work and to obtain his



The Mechanics' Entrance to the Stock Room

co-operation is the policy of having one mechanic present at the weekly co-ordination meetings. At first these meetings included the officers of the company, sales manager, service manager and the salesmen, but the meetings were not productive for the service department. It did not take Mr. Gluck long to discover the

reason. It was, he said, due to the fact that the salesmen and mechanics did not jibe: that is, the mechanic was highly amused at the reports of the salesmen of how they tried to sell the prospect and the lack of consideration given the problems of the service departments and the workers therein. And the salesmen were not interested in the problems of the mechanic.



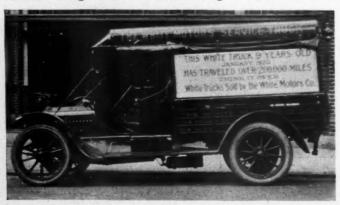
The White Service Station at New Haven
The parts department is close at hand inside the double doorway

So the plan has been altered and the sales and service managers meet the salesmen with officers at the first meeting at which the service manager collects data and suggestions and these are discussed from the service or repair shop angle at a second meeting at which the officers, service manager and a mechanic are present. The mechanics usually take turns attending these meetings at which the workman

present is encouraged to express his ideas. The plan has advantages, among which may be mentioned that it convinces the mechanic that he is an important unit in the organization. Suggestions or complaints are discussed and if a mechanic makes a suggestion that is not good business policy the reasons why the plan would not be practical are explained. In other THE MECHANIC SOLD THE POLICIES OF THE COMPANY. It is but natural to assume that the mechanic will in turn sell his fellow workmen or at least explain policies. These coordination meetings are productive and will, it is believed, do much toward stimulating interest and breeding loyalty.

### The Department Heads Are Always Consulted

A policy differing from the conventional is that heads or departments are consulted. There is no going over the head of a department. If a favored customer desires certain work performed in a hurry, officers of the company or floor men or testers are not allowed to make any promise until they have consulted the head of the department to which the work is assigned. The departmental head advises when the work can be taken in and when it will be ready. And it is ready when promised. Work is scheduled and routed. This practically eliminates the possibility of disappointing a customer. If a job cannot be undertaken at once the customer is so advised. His truck or car is not taken in and excuses given for delays. It is obvious, that with a different policy existing in the past, that some of the "preferred" customers believe they have grounds for complaints but it is here that the service manager steps into the breach, and one of Mr. Gluck's one-man shop policies comes into play. And the policy is to be absolutely honest and truthful with the customer. At the base of this policy will be



The Service Car is Made to Pay Dividends as an Advertising Medium



Ordinary Bread Tins Are Utilized as Small Parts Trays
The larger parts are stored in the conventional wooden bins

found the slogan of the company "THAT SERVICE DOES NOT MEAN GIV-ING SOMETHING FOR NOTHING. IT DOES MEAN GIVING PROMPT ATTENTION AT AS LOW A COST AS POSSIBLE."

Mr. Gluck goes carefully into detail explaining why it may be possible that another "preferred" customer or a number of such can so upset production that he (the preferred customer) may be the loser. The service manager also sells the honest, square deal policy, and to which the customer invariably agrees.

Mr. Gluck has one hobby which is explained by his pet expression of "laying the cards on the table." He believes that the customer should be told nothing but the truth and that excuses are but "passing the buck" from one department to another and that the habit of telling different stories destroys the confidence of the customer in the organization. "And," said Mr. Gluck, "when the salesmen, department heads or others connected with the organization tell different stories the customer concludes that no one knows what he's talking about and consequently the company receives bad advertising."

### Investigate Complaints

At the co-ordination meetings of the sales manager and salesmen, a special effort is made to obtain from the sales department specific reports of complaints made about the service. When any are received Mr. Gluck investigates the records after which he calls on the customer. It may be that a customer fancies he was not given proper attention or that a lack of courtesy was shown him. Mr. Gluck, armed with such data as he can obtain through the service files, calls on the customer and if the latter has a real grievance it is adjusted. If an imaginary one the service manager proceeds to diplomatically straighten it out. In other words, Mr. Gluck is merchandising the service policies of the White Motors Co. and last but not least is selling the White Motors Co. to users and prospects of White trucks. Salesmen and officers make notes

in duplicate of kicks made to them or those they hear of and the duplicates are passed along to the service manager.

### Checking Up on Service Work.

Use is made of a return postal card system for checking the service. A week or so after work is completed the customer receives a postal asking him if the work was satisfactory, if he was treated courteously and if there is any suggestion he can make to improve the service. If no reply is received a follow-up letter is sent and if this fails to bring a reply Mr. Gluck calls on the customer. If a complaint is received it is investigated carefully after which the service manager calls on the customer. This policy is productive of results and the selling of service.

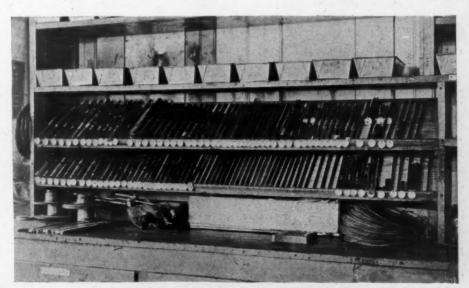
Whenever a "come back" is noted the records are looked over and the mechanic that did the work is consulted and shown his mistake so as to avoid the possibility of his repeating the error. This is done diplomatically and in such a manner as to leave the impression that pointing out the error is educational, not condemnatory.

The policy of doing the customer's work first and satisfying him before attempting to sell him other work is adhered to rigidly. If necessary the tester rides with the truck driver and ascertains the trouble before sending the car to the shop. Upon completion of the work the tester again rides with the driver to make sure that the fault is eliminated and to satisfy the driver that the work he wanted done is done. Testers are instructed to listen courteously to the customer andif the latter assumes knowledge that is humorous to the tester-not to assume that "know it all air" that is the stock in trade of too many skilled mechanics.

If a driver comes to the service station to have certain work done and the tester notes that additional repairs are needed, the same is called to the attention of the driver. If the driver fails to report to the owner and the work is not ordered, the service department gets in touch with the owner. If it later develops other work should be done use is made of a green tag that is slipped in the work order holder on the truck. This tag signals the need of the work and it is not removed until the order is received for the work or the owner decides not to have it done. A record is kept of such, however.

Referring once more to the policy of interesting the mechanics in the organization, it was told the writer that it has avoided labor troubles thus far. It is not generally known that an effort has been and is still being made in New Haven by labor agitators to organize the automobile mechanics. However, the labor agitator received scant courtesy when he approached the men at the White Motors Co., it is said, and the reason is that the representatives at the co-ordination meetings bring up the matter of wages. Whenever any shop in New Haven is reported to pay more per hour than the company, it is investigated and the scale readjusted if the report be correct.

As has been previously stated, an efficient service department cannot be built up in a few months. Mr. Gluck realizes this and is building slowly and carefully. He is working out a plan of traveling



All Large Drills and Reamers Are Kept in a Neat, Orderly Manner

inspector-mechanics and several others which will, he believes, co-ordinate the sales and service departments and make the service organization a smoothly functioning machine. And he believes that the service department can be made to pay dividends and it may be that with his knowledge of the mechanic he will work out some profit sharing plan that will democratize his departments, bring nearer the day when the wielder of the wrench will not be an employee but working for himself. Perhaps the service manager of the White Motors Co. has a vision of an efficient corps of skilled craftsmen, earning not a wage but a profit on his investment of skill and brains. To do this requires a leader, not an executive, a leader who understands the mechanic's point of view and the fundamentals of sound business, and who can weld these units into a perfect co-ordinating machine. And Mr. Gluck of the one-man shop is shaping his policies to this end.



A Corner of the Machine Shop Showing washing table for parts, oxy-acetylene welding apparatus, etc.

### Making an Asset of the "Lost" Prospect

One Philadelphia Motor Truck Dealer Combines Service and a Follow-up System to Get Maximum Results. The "B. O. C." Letter Does It. Other Follow-up Ideas

Your prospect isn't lost—that is, all his usefulness to you doesn't vanish—when he throws you down and buys his car from the other fellow.

This was discovered by the sales director of a Philadelphia motor truck merchandising concern, who prefers to remain anonymous. He says it's easy to turn defeat into victory when you know how.

He says that the salesman in such a case doesn't have to chase up his "lost" prospect, either, with the idea that he will be prevailed upon to give up the truck he has just purchased from the rival company to buy one from him.

Let the sales director tell the story his own way.

"Why give up, after you have spent a lot of your time with a prospect, in making him familiar with the points of excellence of your truck? After you have taught all this to a man you once considered your prospect, it would be foolish to allow this to count as wasted time. If you go about it properly, you have a chance of making this so-called lost prospect one of your best boosters among his friends. Word-of-mouth advertising is the very best kind, as it is the most personal and direct form. My formula, after a prospect has turned me down, is this:

"First, I show him he retains the good will of our house.

"Next, I impress on him that our service extends beyond customers who buy our trucks.

"Soon after that I send him a 'B. O. C.' letter.

"'B. O. C.' in this office is short for 'Bought Other Car.' It tells the story instantly to anyone who may be running

over the cards in the file for prospects.

"You would be surprised to know how many 'lost prospects' a good 'B. O. C.' letter drags back into boosters for us, ending in sales to his friends.

### How the Plan Works Out

"Here's the dope: Nearly every man who owns a truck has friends. He stands on common ground with others in his position and there are so many points of contact in interest that he is sure to have many friends. And a large percentage of his friends is more than apt to be in his line of business—that is, truck users, or prospects for us.

'The 'lost prospect,' in the course of our careful instruction in the excellence of our truck, we'll say, has come to know at least one of our salesmen, and probably several of them. In addition, he very likely knows one or two of our executives and has been accorded the most courteous treatment, as well as becoming familiar with our organization methods. He knows we give our customers a square deal. He knows all this and yet he will, like all other human beings, have to be prodded up more or less, in reminder, if he is to continue to be useful to us. What we build on, then, in cultivating the man who has bought our rival's truck, is to make him like us well enough to recommend us to his friends and his friends to us.

"Here's where the 'B. O. C.' letter gets in its work. While a 'B. O. C.' communication should run along certain general lines, we maintain, it is never lost sight of that its object is to make out of him an envoy for our truck. Anybody with tact, however, can make up his own 'B. O. C.' letter and follow-up system.

While we speak of it as a form letter, we often vary it—and we never use multi-graphed copies—it must always be a personal letter, actually typed.

"In this 'B. O. C.' letter, we usually begin by assuring the one addressed that our interest in him has not ceased just because he has purchased a truck of another make; that, on the contrary, we not only hope that his car is giving him eminent satisfaction, but that, as our service extends beyond our immediate customers, we should be pleased to have him call and consult us at any time regarding suggestions to get even better results from his truck than he may be obtaining, and that we should be glad of the opportunity of advising him should his new truck need adjustment of any kind, adding so as to leave a distinct impression, THAT FOR THIS SERVICE THERE WILL BE NO CHARGE.

"You see, this idea works right in with our service plans," continued the sales director. "I always sign these letters myself, as coming nearer to the executive end of the house than the salesman, tending to let the 'lost prospect' know the organization itself has his interests in mind.

### B. O. C. Letter Helps to Get Prospects

"But the windup of the 'B. O. C.' letter is what lands the big jolt. We earnestly inquire if he knows of anyone among his friends—'many friends' is a good way to express it—who would be interested in a car such as ours, especially as he has been made thoroughly familiar with all its good points.

"We furthermore assure him that we would greatly appreciate and value any suggestion he might care to make along the line of such a prospect.

"The usual result is that the letter in time becomes productive. It might be classed as a form of 'indirect' advertising. We usually get a quick reply showing the former prospect is rather pleased at being thus considered by our house, although he does not, naturally enough, send us a prospect immediately, but the chances have seemed to be good that he will send us one within a short time. This is particularly true if he begins to be a bit disgruntled about the service end of the concern who sold him the truck.

"This goes to show that the 'B. O. C.' letter handled properly, is an asset.

"Of course, we have other form letters where we have been successful in selling a truck. In our follow-up system, the first letter sent out by us after the purchase, arrives the day after the car has been delivered to him.

"It says in substance that we have encouraged him to expect the maximum of service and that it will be our business not only to see that he is not disappointed, but that he is surprised by the thorough and efficient manner in which we will take care of his truck. We add that it is our intention to make him that most valuable asset of any business—a satisfied customer.

"Our guarantee on faultless construction of parts, of course, is the usual one for ninety days and we ask the customer to bring in his truck once a month for twelve months for inspection, for which there will be no charge. After the expiration of the period, if there is any work to be done on his truck, we make it clear that he will be charged our regular shop rate per hour.

### The "Thank You" Follow-up Letter

"Another form letter which we consider pays, is the 'thank you' follow-up, a little courtesy which seems to be greatly appreciated, but which is not always thought of, or at least done, by truck dealers. This letter, also signed by me, is sent out following the very first call made by a salesman on the prospect.

"We begin this letter by using the salesman's name, so the prospect will remember it when he stops in. This not only helps the prospect, but it is an aid to the salesman, for obvious reasons. We say, for instance, that 'Mr. Blank, of our sales force has advised us that he has had the pleasure of calling on you,' and so on, and finally we thank him for his courtesy. This gives an initial personal

touch with our organization which we endeavor to maintain throughout our relations.

### Spotting Dilapidated Trucks

"Another favorite way of ours, in going after a prospect, is to have our sales force always keep on the alert as they go about their business, or sit in the office, for motor trucks that look either dilapidated, or show signs of needing repair in any particular.

"Of course our men are service salesmen enough to tell just about what ails a car that needs repairs in any way and as soon as one of them spots such a case, he makes a note of it. The car license number is jotted down and the owner looked up. This is particularly easy in the case of a motor truck, as most of them bear the owner's name, or the title of the firm.

"In these cases, we either send a letter to the owner of the truck, calling his attention in a diplomatic manner to the fact that just such corrections are part of our service work, or we send a salesman direct for an interview, which is usually the better way if he can be spared.

### F. W. D. School of Instruction Includes Office Employees in Its Student Body

A plan has been inaugurated by officials of the Four Wheel Drive Auto Co., Clintonville, Wis., whereby the scope of the School of Instruction conducted at its factory has been enlarged to include

tion with other departments, to the ultimate benefit of its users.

Employees taking the course are paid on the same basis as when doing their regular work. Each class is of three





The Employees Are Required to Do the Actual Work of Assembling

every male employee in its office, regardless of the nature of his work. Classes in this school, which formerly comprised almost entirely service men from its various distributing centers, now embrace bookkeepers, clerks and other office men.

It is the opinion of the executives of the company that an individual understanding of the principles of construction and a knowledge of the various parts used in the make-up of the truck will expedite the work of each department in its relaweeks' duration, during which time every part of the truck from the principles of construction, types of driving, gear ratios and other essential points, are thoroughly mastered. Every student must do the actual work himself, of fitting each unit on the chassis in assembling a complete truck. Severe examinations follow the completion of the course. According to the policy of the company, all dealers must agree to send a service man to this school for a thorough training in FWD methods of operation and construction.

### Gasoline Price Probe Proposed

WASHINGTON, April 25.—Investigation by the Federal Trade Commission of the causes for the four recent increases in the price of gasoline and other petroleum products is being urged by Representative L. P. Dyer of Missouri, a member of the House Judiciary Committee.

In a report on this resolution to the House by instructions from the Judiciary Committee, Representative Dyer said:

'Motor fuel has become of vital importance to practically every industry, not excluding agriculture, in all portions of the United States and the civilized world. At the present time the disposition of and the price of motor fuel is in the hands of two enormously powerful capitalistic combines, world-wide in their source, and if improperly used, a very dangerous power. The United States Government should give special attention to this matter at this time. Retail prices have been greatly increased of late. It is stated, on what is believed to be reliable authority, that large advances in the price of gasoline, etc., will be made again soon. If the fabulous prices now being charged is due to a scarcity of the product, then the Government should use every possible means to foster the production of power alcohol, and to give encouragement to its production and use. The Judiciary Committee is of the opinion that the Federal Trade Commission make the earliest possible report touching this inquiry, so that the Congress may take action, if necessary, before the adjournment of the present session."

S. F. Bowser & Co. has originated a subsidiary company, S. F. Bowser & Co. of Texas, for sale and distribution of Bowser products in Texas and parts of Oklahoma, Arkansas and New Mexico. There is a Dallas office at present.

### Adopts a Novel Policy to Retain the Serve and Eliminate the Vice in Servicing Magnetos

Lauraine Magneto Company Employs Units Instead of Parts. Each Type Has Fourteen Units, and New Units Are Exchanged for Old. List Price of Units Less Than List Price of Completely Assembled Magneto.

HE Lauraine Magneto Company, Inc., Long Island City, N. Y., manufacturer of the Lauraine magnetos, has determined upon a service policy that not only differs from conventional practice but includes a number of novel and interesting features that should appeal to the truck dealer, particularly the small town dealer or the one located in undeveloped territory. The policy was evolved by Leo Potter, general manager and second vice president of the company, after careful study and research, and it is based on the fundamental principle of good will, that good will in business is created when the manufacturer formulates fair prices, renders prompt and efficient service and gives the user or customer a square deal. Mr. Potter is cognizant of the fact that a correctly designed and constructed automotive unit may fail to satisfy when improperly serviced and has, therefore, endeavored to eliminate the possibility of such service in his policy.

### Service at Low Cost

"In formulating a policy I first considered two things," said Mr. Potter. "First, a service that would be superior to those practiced, and second, how to give this service without increasing the cost to the user. In studying various service policies I have found that the cost of replacements, labor, and the maintenance of the service organization, overhead, is passed along to the consumer. It is a matter of record that the cost of the complete parts of any automotive unit, at the list price, greatly exceeds the manufacturer's retail price for the completely assembled unit. In this respect we differ from conventional practice for the cost of a Lauraine magneto assembled with parts purchased at list or retail is less than the list price of the completely assembled unit. This may be a radical move, but is one, we believe, will react favorably."

### To Exchange Old Units for New

"Relative to the service, it is based on the slogan of the company, 'The Lauraine Magneto Never Fails,' and that with the replacing of the few parts subject to natural wear with new ones the magneto can be guaranteed for life. The most striking features of the policy are: The exchange of new units for old and the use of a unit system making possible the removal and replacement of a unit by those not familiar with the technicalities, construction or repair of magnetos.

Instead of supplying the dealer or any factory representative for that matter, with a parts book, listing and illustrating

one hundred and seventy odd parts, the Lauraine Magneto Company will issue a single sheet, similar to the one illustrated herein, on which there will be fourteen units. Each of these units will bear a number, and a name, and whenever any part in these units becomes worn or damaged the unit, not the part, will be replaced as a unit and by a new unit.

### How the Exchange Functions

For example: A driver attempts to parallel the contact points of the breaker and files away the platinum. Instead of the dealer servicing the truck, removing the interrupter lever and the fixed contact point, obtaining and installing new points and adjusting them, he will mail the complete breaker to the factory. He can wire the unit number and serial number, which, in this case, would be Unit No. 413. A new unit will be sent, and on receipt of the old the dealer will be credited for the unit less the cost of the contact points. Whenever a unit is returned it will be credited less the parts unfit for renovation. This policy is to be pursued with all units, and should a condenser or the windings of an armature develop trouble, the complete armature (it includes the condenser) must be re-

### Saves Time and Money

Mr. Potter states that the plan will save money for the owner, as the usual repair charges on the hour-labor basis and high list replacements are eliminated. Where the work is attempted by mechanics not entirely familiar with a magneto, the saving effected will be considerable, to say nothing of the time saved in sending the magneto to a service station or the factory, and that required for rebuilding certain groups.

It may be contended that it will require time to disassemble the magneto to remove the unit and that certain magneto knowledge will be required to ascertain

### Index of Articles Which Appeared in Previous Issues on Repairing and Overhauling Various Units

| 8                   |                     |          |     |
|---------------------|---------------------|----------|-----|
| Continental Engine. | Model C. Jan.,      | 1919, p. | 43  |
| Continental Engine  | (cont'd) Feb.,      | 1919, p. | 91  |
| Vim Clutch, Mode    | 1 20 & 21. Mch.     | 1919, p. | 27  |
| Vim Rear Axle, Mo   | del 20 & 21 . Apr., | 1919, p. | 64  |
| Troy Trailers       |                     | 1919, p. | 32  |
| Vim Engine, Mode    |                     | 1919, p. | 67  |
| Clark Int. Gear Di  | rive AxleAug.,      | 1919, p. | 43  |
| Buda Engines        |                     | 1919, p. | 79  |
| Eisemann Magneto    |                     | 1919, p. | 34F |
| Timken-Detroit Ax   | clesDec.,           | 1919, p. | 113 |
| Splitdorf Magneto,  | Model 448. Feb.,    | 1920, p. | 43  |
| Berling Magneto,    |                     | 1920, p. | 35  |
| Detlaff Clutch, Mo  | odel HApr.,         | 1920, p. | 61  |
| Lauraine Impulse    | Starter Apr.,       | 1920, p. | 63  |

which part is at fault. With the unit system the magneto can be easily and quickly disassembled, for complete units are displaced, not parts. As to locating failure of the magneto to produce a spark, it is contended that if the contact points open and close, the gap correct, the breaker box in position, brushes not broken, distributor board not burned or carbin dust present, failure of spark is due to the windings or the condenser. Instructions for examining the contacts, etc., are to be supplied with each instrument and to dealers.

at the Lauraine factory. Instead of production being concentrated on finished magnetos, units are produced and, as previously pointed out, these can be quickly assembled. All units supplied for replacement are guaranteed for one year, and to fit accurately. Mr. Potter says his plan will eliminate the usual service department at the factory and other overhead charges. A few men will be employed to disassemble the units returned,

The unit system described is employed

the usable part of which will again be assembled. While there are fourteen units listed on the parts sheet or bulletin, attention is directed to four which it is believed will never have to be exchanged. These are the distributor end plate, contact and plate, body group and water-

proof cover.

### Gypping the Gyp Repairman

Mr. Potter believes his service policy will cure two evils in the magneto industry, those of the pirate part and the gyp dealer, insofar as his company is concerned. The exchanging of old units insures the use of factory parts and correct assembly. This plan will also prevent the gyp from offering to trade in the faulty magneto for a "rebuild" of the same make for a "consideration." He will not find it profitable, particularly with the owner aware of the policy of the Lauraine Company—that of low cost replacements made possible by a quantity production.

It should not be taken for granted that the service policy will eliminate the magneto service station, for the company will establish such, and these, besides carrying a stock of brushes and other quickly replaced parts, will also carry a stock of complete units, exchanging new for old, on the same basis as the factory. As units are exchanged the old ones will be returned to the factory, which will exchange them for new ones. These service stations will act as a clearing house, and as such is expected to render prompt and efficient service which, after all, is one of the fundamentals in obtaining the good will of the user.

### Diagnosing Trouble and Disassembling the Lauraine Magneto

The following are the methods employed in entirely disassembling the magneto, and the process described and illustrated is the reverse of the factory method of assembling the fourteen units. Each unit is given a number the first digit of which represents the type. The second and third digits indicate the unit. For example: number 406. The four indicates a four-cylinder magneto and the 06 the unit, a distributor gear. A distributor gear for a six-cylinder magneto is given the No. 606, that for an eightcylinder the No. 806, etc. The direction or drive of the magneto is indicated by letter K, indicating clockwise movement, and T, anti-clockwise.

### The Units and Order of Assembly

The fourteen units, numbers, names and factory method of assembly are shown in an accompanying illustration, and are as follows:

Unit Number Name

403.....Body group

405..... Distributor end plate

414.....Complete armature

406..... Distributor gear

409.....Contact end plate 410.....Stud screw

404.....Collector brush holder

413.....Breaker

breaker box cover to one side and remove break box cover (Unit No. 412).

Remove the eight screws securing the magnets and LIFT OFF BOTH MAG-NETS AT THE SAME TIME, not sep-

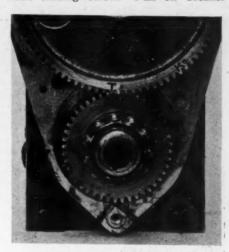


The Lauraine Magneto Composed of 14 Units

The distributor board (Unit No. 408) and breaker-box cover (Unit No. 412) are displaced by slipping retaining springs to one side. The stud screw (Unit No. 410) carries one of these springs.

arately. This is important. If magnets are not to be replaced immediately bridge their open ends with a piece of iron or steel to avoid loss of magnetism. In removing the magnets lift up the front oil hole lid. Remove distributor finger (Unit No. 407) by pulling out straight. Displace breaker box (Unit No. 411) in a similar manner.

The breaker, Unit No. 413, is secured to the armature shaft by a right-hand hex-headed screw. To remove breaker screw use wrench attached to contact point gauge. Grasp coupling at driven end of armature shaft to prevent its turning when turning screw. Pull off breaker



Showing Indicating or Timing Marks on Distributor Gear and **Armature Pinion** 

Letters K and T indicate clockwise and anti-clockwise, respectively, and about three teeth to right of letter will be found a prick punch, which is aligned with prick punch on pinion. The mesh shown is for a anti-clockwise magneto.

from shaft. The breaker base or disc has a key integral with its hub, and the key fits a keyway in the armature shaft. In replacing breaker it is IMPORTANT THAT KEY REGISTERS WITH KEYWAY.

### Displacing Collector Brush Holder

The collector brush holder (Unit No. 404) is located in the body group (Unit



Illustrating the First Step in the Disassembly.

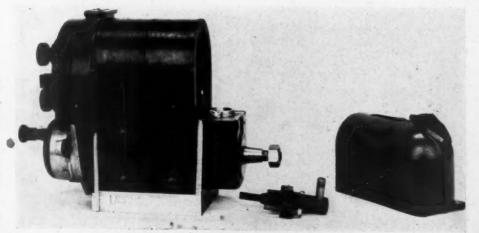
The waterproof cover (Unit No. 402) is displaced by grasping it with the right hand and pulling straight out. The front and rear oil reservoirs are also shown; also markings T on magnets.

411.....Breaker Box 407.....Distributor finger 401..... Magnets

412.....Breaker box cover 408.....Distributor board

402......Waterproof cover

To disassemble the type K Lauraine hagneto reverse this order and utilize the illustration to identify the units, starting with the Unit No. 402. To remove the waterproof cover grasp the base of the magneto with the left hand, and with the right pull the cover out straight, as shown in the illustration. If the cover cannot be removed with the hand, insert the tip of the blade of a screw driver between the magnet and oil hole or lid, and pry gently until waterproof cover starts, then remove with the hand. Remove the distributor board (Unit No. 408) by pressing the retaining springs or clamps outward and lift off board. Slip the retaining spring or clamp of the



Removing the Collector Brush Holder (Unit No. 404)

This is secured in body group by two screws and carries brush contacting with collector spool of armature. In replacing the brass member, forming one-half of safety-spark gap, it must face front or distributor end of magneto

### Order of Assembly of Lauraine Magneto Units

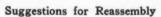
Unit 406 Unit 403 Unit 414 Complete armature (48 parts) Distributor gear (2 parts) Body group (12 parts) Distributor end plate (21 parts) Unit 409 Unit 404 Unit 407 Unit 410 Unit 411 Unit 413 Collector brush holder (5 parts) Contact end Distributor finger Breaker (26 parts) Breaker box Stud screw (4 parts) (6 parts) plate (6 parts) (5 parts) **Unit 401 Unit 412** Unit 408 Unit 402 Unit 415 Final assembly consisting of screws, nuts, etc. (10 parts) Breaker box (10 parts) Distributor board

Illustrating the Unit Feature of the Service Policy of the Lauraine Magneto Company

Instead of a parts book listing and illustrating 170 odd parts a single sheet will be used showing the 14 units comprising the Lauraine magneto. Replacements will be units and ordered by number. Illustration shows factory method of assembly and to disassemble start with Unit No. 402, next 408, etc., reading from right to left.

No. 403) at the driving end of magneto. Displace screws (2) securing holder and lift out. To remove stud screw (Unit No. 410) use a five-sixteenth-inch wrench. The stud has a right-hand thread. Displace coupling and Woodruff key, securing it to armature shaft. The next step is to remove the contact end plate (Unit No. 410). This is accomplished by taking out two screws. These and the stud screw secure the plate. Remove the distributor gear (Unit No. 406) by pulling it forward and out. Tip the magneto over on its side and loosen screw holding flat

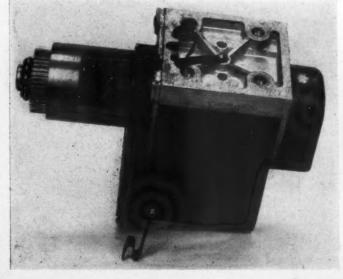
spring on base or bottom of the body (Unit No. 403). Lift out brush attached to wire which, in turn, is secured to base. Remove armature (Unit No. 403) by pulling out from body, removing the armature at its pinion end or that end to which the breaker is attached. Two units are now left: Nos. 403 and 405, the body group and distributor end plate respectively.



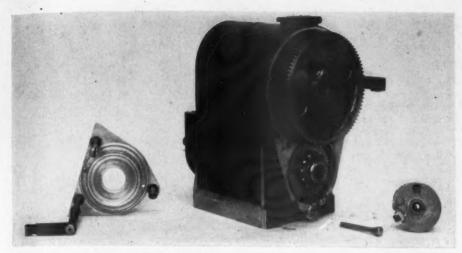
In the reassembly reverse the process. In replacing the magnets lift up the front oil hole cover or lid so magnets will clear, and in replacing the magnets have the letter T of each on the same side and BOTH T's ON THE RIGHT-HAND SIDE OF BODY GROUP when facing the rear or coupling end of the magneto.

Before replacing distributor gear press down oil wick in the distributor bearing in distributor end plate. This is easily accomplished with the tip of the blade of a screw driver inserted from the rear of the end plate. Press down wick until hub of distributor gear passes over wick.

When either the distributor gear or ar-



The Armature (Unit No. 414) is Partly Removed With Its Pinion Before displacing ar-mature loosen screw of spring on base, slip spring to one side and lift out brush wired to base.



The Contact End Plate (Unit No. 409) is Retained by Stud Screw and Two Screws Illustration shows circuit breaker and retaining screw removed and distributor gear (Unit No. 406), which is displaced by pulling it straight out

mature have been removed it will be necessary to retime the magneto. This is not difficult, as the armature pinion and distributor gear have indicating marks, i. e., are prick punched. All that is necessary is to see that the male tooth of the armature pinion carrying a prick punch is

should be made to alter the tension of the springs.

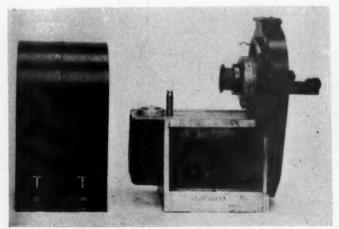
The service policy of the company provides for the replacement of a damaged or worn breaker with a new unit and the contact points are, therefore, adjusted at the factory. It may be that the cams

contact block rests in the center of either cam of the breaker box when the points should be fully separated. Insert gauge attached to magneto wrench. If gap is correct, the gauge will fit snug. If the gap is incorrect, too small or too large, adjust it by loosening the locking nut of the fixed contact screw and turning screw in or out (right-hand thread) until the correct gap is obtained. Tighten locking nut and again use gauge, as it is possible to change the adjustment when tightening the lock nut.

When disassembling the magneto for replacement of a part it is suggested that any carbon dust or other foreign elements be removed from the distributor board, collector spool of the armature, and that the distributor segments be inspected for burning. Cleaning is best accomplished with a soft cloth moistened with gasoline. The breaker may be similarly treated.

### How to Lubricate

Provision is made for lubrication by an oil hole on the top of the distributor end plate and on the waterproof cover. Use about five drops of a high-grade, light machine oil in each oil hole about every eight hundred miles of operation of truck.



Showing Magnets (Unit No. 401) and Distributor End Plate (Unit No. 405).

Magnets must be replaced with T on right side of body group when facing the rear end of instrument. Illustration indicates correct position for replacement.

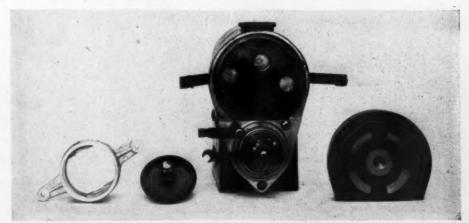
meshed with the distributor gear so that the prick punches of each will be exactly in line. An accompanying illustration makes clear the process. Inasmuch as the face of the distributor gear carries both letters K and T, indicating as previously pointed out clockwise and anti-clockwise drive, there will be found two prick punches on the face of the gear. In remeshing the distributor gear of the clockwise magneto use the prick punch nearest the letter K. This will be found to be about three teeth at the right of the letter. The indicating mark for the anti-clockwise will be about the same distance at the right of the letter T. It is a simple matter to note the relative positions of the marks before removing the distributor gear. Simply rotate the armature shaft in its proper direction until the indicating marks coincide and note the letter.

### Examination of Brushes

In the disassembly it is suggested that the brush in the distributor finger and collector brush holder be examined to see that they move freely. No attempt of the breaker box that have seen considerable service are worn, which may require a readjustment of the gap of the contact points. In such case, it is suggested that the gap be gauged. To do this rotate the armature shaft until the

### Motor Vehicles Essential to Farmers

Motor trucks and automobiles are so much a part of the necessary equipment of the farmers of the United States that they are purchased even when contrasting conditions upon the farm are peculiar. A survey of one farming section showed that 88 per cent of the farmers there used trucks and automobiles, although on these farms water was carried to the kitchen, upon the average 72 per cent of the farm length, on one farm the distance was half a mile. Only nine farmers had bath tubs in their homes, and only 7 per cent used even chemical toilets, over 83 per cent used kerosene lamps, and only 7 per cent had electric lights. In four-fifths of the houses stoves were used for heating. Yet the farmers found it necessary to be modern in one way; they had to have trucks and automobiles.



Illustrating Use of Magneto Wrench When Removing Hex-Headed Screw Securing Breaker (Unit No. 413) to Armature Shaft

The screw has a right-hand thread, and armature must be held to prevent turning. Grasp coupling on driven end when using wrench. Coupling should be left on shaft

### Advertising the Filling Station\*

DVERTISING at a Filling Station may be termed as being of two classes, direct and indirect.

I have, for some time, been of the belief that the latter is more effective and pays much larger dividends than the former. Indirect advertising consists almost entirely in a service given to your patrons, and is usually very inexpensive when considered in the light of advertising. Your free air and water stations come under this class. Other items are the arrangements for your patrons securing a good drink of cold water, summer and winter, the appearance of your building, grounds and drives, the manner in which station is lighted at night, and the courtesy afforded your patrons.

One company has a small, four-page folder showing the roads of their own and adjoining counties. It also gives a list of the best garages and hotels, and their rates, condensed time-tables of railroads and steamship lines entering the city and the principal points of interest. On the front page is a list of all their service stations in their own and adjoining cities.

Another company believes that information of this character should be given verbally. This method is alright, except—when the attendant is very busy, is affected with the disease commonly known as "grouch" or does not know. To give a patron a wrong direction or wrong information or to give it discourteously is more than telling them nothing.

Under the head of direct advertising we consider all signs, etc., actually on the Perhaps, I believe, that the design of the building, its location on the lot, the driveways and the pumping equipment should show the class of business being conducted and that about the only thing necessary in the way of a sign is the name of the company. This should be in a plain block letter suitably placed on the building. It should be of such size as can easily be read at a distance of one hundred and fifty feet. A plain electric sign with only the word "GASOLINE" and so placed as to be seen some distance at night is good practice and will also help to light the grounds. If accessories or tires are handled, the two words displayed will be sufficient. Do not allow the building or its grounds to be plastered with the small tin and paper signs of tire and accessory manufacturers.

Large Bulletin Boards very seldom improves the looks of a station and they usually hide a portion of the building or its equipment from some angle, to the approaching driver. They are certainly detrimental when the station is located in a good residence district. However, if it is decided to use bulletin boards, see how little you can put on and not how much, and see that what you do put on carries "punch" with it. The size in most general use is 10 ft. wide and 8 ft. high, and is

usually placed between ornamental posts and about three to four ft. above the ground with a lattice underneath.

Pictorial signs are very seldom desirable for Filling Stations. The color to be used in sign work is a very important matter. They should be such that they will blend with the station and its trimmings. For this class of work, two colors besides the background is enough. Black, dark blue and green or a brilliant red on a white or lightly tinted background, or a bright orange, white, light blue and green will show on a dark background. Dull reds never look well or attract the attention in sign work. All colors outside of black and white will fade more or less, making repainting at frequent intervals necessary and consequently increasing maintenance charges.

Companies having a trade-mark, should, when possible show it at a Filling Station, either on the building or on the bulletin boards, when they are used.

The placing of bulletin boards or other signs about a Filling Station should be very carefully worked out. If possible get a representative of some outdoor advertising concern, who is well-versed in this work, assist you.

### Parking Areas and Care of Grounds

The parking areas, that is—those portions of the lot not actually used in operation of the station are an important item.

All ground not actually necessary for the efficient operation of the station should be well-graded and either sodded or seeded. If these plots are of sufficient size, flower beds will add greatly to the appearance.

Well-designed ornamental light posts located at either side of the approach to driveways and at such other points about the grounds as necessary will attract attention and also serve to reduce the accident hazard at night. These may be of concrete, brick or ornamental iron.

Some companies are using artistically-designed fences or walls of wood, concrete or brick to enclose al sides of the lot not open to the street. Extreme care should be exercised to see that the grounds and everything about the building is kept scrupulously clean.

### Small Equipment and Tools

The operation of a filling station is not very much different than any other business inasmuch as the absence of the tools necessary for good service, operating efficiently, and proper maintenance will react in the form of a loss of business, high operating and maintenance charges, thereby decreasing the profit to the owners.

When the business is opened, all tools and equipment should be carefully inventoried and charged against the attendant and receipt taken. They should be inventoried at intervals of not to exceed 60 days, while 30 days would be better.

When tools are lost or carelessly broken they should be charged against the attendant and deducted from his salary. This will soon insure a full complement of tools at all times, and teach the attendant care of equipment.

Some operators are furnishing their attendants with flashlights. The principle of this is all right, but I believe a better method is to have a push socket installed on the outside of the building and furnish the attendant with an extension light of No. 14 armored cable and equipped with a vapor lamp cage.

Small gauge sticks marked in inches, for gauging the tanks should always be on hand and kept where they can be found without keeping the customer waiting. There should be one gauge stick accurately graduated to quarter inches, for gauging the stock in tanks. If these are painted black and varnished, they will be found to give better results.

The following tools and equipment will be found necessary for the upkeep and maintenance of a station:

8 ft. Step Ladder; Rake; 2 Warehouse Brooms (One for inside of building and one for driveways; Sponge; Window Rubbers; Lawn Mower; Sheep Shears for trimming edges of lawns; 50 ft. ¾-in. Garden Hose with nozzle and reel; Snow Shovel.

If several stations are operated in one city, a traveling janitor or porter can be employed to good advantage. When equipped with a small car, he can carry some of the tools with him, and relieve the necessity of having them at each station. He can also carry a small quantity of paint and touch up such places as require it, and make small repairs.

Every station should be equipped with at least two one-quart fire extinguishers of the carbon tetrachloride type. It would be well to have another 2½-gallon extinguisher of the soda-acid type. These should be placed in plain view where they can be easily reached in case of emergency. Every attendant should be fully instructed as to what class of fires each is best designed for. If occasion demands their use, they should be cleaned out and recharged the same day. Do not postpone this work until tomorrow.

There should be a pint, quart and twoquart measure for each grade of lubricating oil handled. Measure or funnels should be equipped with flexible tubing or some similar arrangement to allow the attendant to reach the openings in oil reservoirs without spillage. Measures and funnels of copper will cost a trifle more but will give much better service, and will be more acceptable to Weights and Measures Officials.

### Study of Laws and Ordinances

Regardless of whether you are leasing or buying the real estate which you intend to use for a filling station site, have the title papers carefully examined as to use for business purposes, class of buildings, their position on the lot or other building restrictions, etc. Also examine local ordinances, building code and court ruling for same items.

<sup>\*</sup>This is the fifth of a series of articles written by F. A. Bean, Consulting Engineer, Wayne Oil Tank & Pump Co., on the planning, arrangement, equipment and management of filling stations.

Local ordinances, local building code, State Laws, State Fire Marshall's Orders and Court Rulings should be examined relative to the storage and dispensing of hazardous liquids, the size, location and class of tanks which may be permitted, the location of fill boxes and pumps. This likewise applies to the location and size of driveway approaches.

The local sealer of weights and measures should be interviewed as to the installation, testing and sealing of the pump-ing equipment. The kind of position of the advertising matter which you may place on your property is another thing covered by local ordinances in many cities.

Do not try to evade the Laws. Public Officials are usually men of business and consequently reasonable and if existing laws or ordinances are really detrimental to the best interests of all concerned, they can be repealed or amended. It is also advisable to consult with insurance men, in order to know that you are conforming to the recommendation of the National Board of Underwriters under whom they operate.

The local Boiler Inspector or Board of Public Safety will probably have jurisdiction over the air compressor and designate the tank specifications. Everything under this heading should be carefully gone into before any work is actually begun.

### Eliminates the Undesirable Applicant

LOCKE, manager of the Federal Motor Truck Co., New York City, a factory branch, has evolved what he terms an examination sheet for applicants for positions as truck salesmen. The list of questions was compiled for two main purposes. One to conserve Mr. Locke's time in examining an applicant as to his qualifications, looking up his pedigrees, etc., and the other to separate the wheat from the chaff. In other words, Mr. Locke believes that an applicant who will answer all of the questions is really interested in merchandising trucks and that the floater type of salesman-and there are many in The form is as follows:

the big city-will not fill out the form. The form is headed the "Prospective Salesman's Record" and judging from the data the applicant must supply it must be effective, at least Mr. Locke says it is.

Opinion differs among dealers as to the value of their salesmen possessing mechanical knowledge of the chassis components. Some successful dealers, and who have a dozen or more salesmen, say that technical or mechanical knowledge is not essential in sales as the men are selling transportation, not mechanics. On the other hand there are some large dealers who are training their men along mechanical lines. An example is the Federal Motor Truck Co. of New York. Every two weeks the salesmen meet for instruction. At each meeting a different unit is brought in from the parts room and the foreman of the service station explains the fundamentals of each component, its relation to other parts; its good points, for example, if an axle is under discussion, a comparison is made with another type of axle, and the plan is to have an axle of the type discussed at hand. The information imparted is not technical, but practical, so that the salesmen can answer intelligently any questions asked by the mechanically inclined prospect. Up to the present time the various units such as gear sets, engines, ignition, cooling, drives, etc., have been discussed. The policy is for the salesmen to know not only what is in their truck, but in their competitor's, and instruction is given when making comparisons not to knock the other but rather sell the superior points of the home product. This same company holds weekly sales meetings at which the best methods of obtaining

### PROSPECTIVE SALESMAN'S RECORD

You may add any further information which you may deem desirable in a letter attached to this application.

NAME IN FULL
ADDRESS
TELEPHONE
TERM OF RESIDENCE
AGE HEIGHT WEIGHT RELIGION NATIONALITY
MARRIED OR SINGLE CHILDREN HOW MANY DEPENDENTS
PRESENT CCUPATION
PRESENT EMPLOYER AND LINE HANDLED \*

Where and in what capacity have you been employed during last position up to five years and length of time in each (state last place first and work backwards).

All information given herein will be held in absolute confidence and no names or references consulted without first securing applicant's permission.

EMPLOYER ADDRESS BUSINESS POSITION

Give reasons for leaving in each case separately and specifically.

Any other business experience? Can you furnish bond? Give three references. Education.

Give three references.
Education.
Have you studied any subjects since you left school or college that might aid you in the position applied for?
If so, to what extent?
Have you any chronic aliment?
Any defect in sight or hearing?
To what extent do you use alcoholic beverages?
If engaged, do you agree to devote your entire time and attention solely to our line during business hours?
Are you a member of any Clubs, Societies or Associations, etc.?
If so, specify:
Are you especially acquainted with certain lines of trade?
If so, specify:
Amount of trade in allowances, if any, and cut prices.
If you have previously sold trucks, state net cash value of sales during each year.
Average weekly earnings for past two years.
Average weekly earnings for past five years.
Average weekly earnings for past five years.
If earned in occupation other than selling, state how.
How much must you earn to meet your necessary living expenses?
What amount do you consider yourself capable of earning in handling our line and following our sales policy?
What amount would be satisfactory to you and what plan of payment do you favor?
Commission Drawing Account Salary and Percentage Salary
Reasons for changing occupation.
Why do you wish to join our sales department?
When could you give your entire time and attention to our work?
Check which territory you would prefer (select two or three).
Manhattan (what section).
Bronx.
Westchester.
Jersey City and vicinity.

Westchester westenester. Jersey City and vicinity. Staten Island. Brooklyn (what section). Long Island City and nearby Queens. Reasons for selection.

SIGN YOUR NAME IN FULL

The Acme Motor Truck Co. is building a new wing to its plant and enlarging its office building. C. J. Helm, the secretary, predicts \$5,000,000 business for this year.

pect. It is the policy to bring the pros-

pect to the service station and show him the parts room and service department.

leads, follow-ups, closing difficult prospects, approaching customers, follow-up literature, service letters, etc., are discussed. It is a round table discussion and it is interesting to note that the viewpoint of the men influences the policies, it being stated that their being in direct contact with the prospects qualifies them to A transportation engineer is a

part of the sales organization and he can be called upon by a salesman if the latter finds the problem too complicated. This engineer also gives talks on loading, routing, costs, etc.; in fact, conducts a school. Salesmen are also instructed as to their limitations when talking service to a pros-

advise.

### Service Station and Repair Shop Appliances

### Jiffy Cutter

The Jiffy Cutter, although a tool that may be utilized to advantage over a large field of service, is especially adapted for cutting boles in the instrument board for the application of instruments. It greatly facilitates the installation of speedometers, gages, clocks, ammeters, etc. It can cut alike through wood, sheet metal, cast iron, boilers, tanks, etc.



Showing the Facility With Which the Jiffy Cutter May be Handled

The Jiffy Cutter outfit, Model No. 1, cuts holes from 1½ to 3½ in. and sells for \$15. Other intermediate sizes up to the 1½ to 6½ in. size which is \$25, can also be had. Extra knives for special cutting can be secured as extra equipment. This tool is manufactured by the Paul W. Koch & Co., 19 S. Wells St., Chicago, Ill.

### Frayer-Miller Wheel Drag

The Universal Wheel Drag, Model No. 2, made by the Frayer-Miller Co., Room 404, Bank of Commerce Bldg., Columbus, O., is a device mounted on three wheels. It is especially adaptable for removing and replacing heavy wheels, and equally convenient for transporting wheels from one place to another. It is capable of handling wheels weighing 1500 lb. or more, with single or multiple tread up to 24 in. wide.

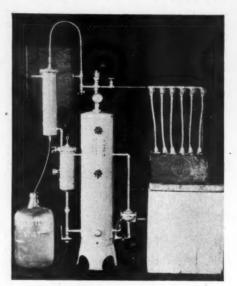


This Device is Known as the Frayer-Miller Wheel Drag

### Eureka Automatic Steam Generator and Water Still

Quick and accurate battery tests can be made with the Automatic Steam Generator and Water Still manufactured and recently announced by the P. M. Lattner Mfg. Co., 515 F Ave., West, Cedar Rapids, Iowa. With it immediate inspection can be made as it requires but fifteen minutes to raise 20 lb. of steam and after turning on the water and the gas, which is ignited by a pilot light, the fuel and water controls are automatic.

The scale and lime, called "precipitation," takes place in the copper coil, the point of intense heat in the generator, but the circulation through the coil is upward



Eureka Automatic Steam Generator Complete

and so rapid that all precipitation is carried to the top and finally comes to rest at the bottom of the water log, from which point it can be easily removed by "blowing off" through the blow-off cocks on both sides of the boiler at the bottom.

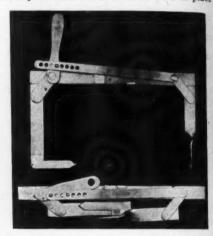
The smallest outfit, No. 1, furnishes

ample steam and distills 3 gal. of pure distilled water an hour at 4c per hour; city gas \$1 per thousand. The price complete with a 3gal. water still, automatic water and fuel control, steam gage, safety valve, water gages and all valves is \$125 assembled, crated, f.o.b. Cedar Rapids, Ia. Extra for gasoline burner \$10. Six-cell battery opener, \$12. Height overall, 6 ft. Width overall, 2 ft. Weight

### Fitz-Awl Valve Lifter

A combination valve spring compresson and valve lifter is being offered to the trade by the Wayland Specialty Mfg. Co., Inc., Wayland, N. Y. A feature of this device is its portability as it can be folded up into a very small space. It will fit practically all standard engines.

The uprights consists of two bars which slide past each other and are held in place



Assembled and Collapsed Views of the Fitz-Awl Valve Lifter

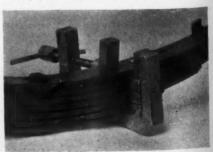
by clamps. The upper and lower lift bars are hinged to the upright sliding bars, thus permitting them to fold. The upper lift bar is equipped with a valve center, which also folds. This valve lifter will lock in a raised position by throwing the handle up and past the center. This device is 16 in. long and weighs 3 lb. The price to garage and repair men is \$5.

### All Leaf Spreading and Oiling Device

A new device that separates all the spring leaves simultaneously permitting the oil to flow freely from the device into the grooves, was recently announced by the Thomas-Armstrong Co., Inc., 1777 Broadway, New York City.

This tool is of cold rolled steel, case-hardened and weighs  $2\frac{1}{2}$  lb. It is equipped with 10 wedges which will separate 11 leaves. All sizes of springs, regardless of the number of leaves, can be taken care of by this device as the extra wedges are readily removed or replaced.

The price of this tool is \$3.



Thomas-Armstrong Device Employing
Five Wedges

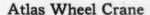
### Testing Gage for Cylinders

A device for ascertaining the inaccuracies of a cylinder wall is being manufactured by the Federal Products Co., 393 Harris Ave., Providence, R. I. It is known as the Federal Cylinder Testing Gage. The main feature of this test gage

is that the gage feelers are in the cylinder and the gage dial is in plain These feelers view. bear at their inner end by means of spiral springs against a cone cam which is directly connected by a steel rod running through an outer casing to a rack movement and spur operating the gage dial. A lever provides means for lowering the cone shaft and permitting the feelers to recede sufficiently to be inserted in the cylinder. When pressure is withdrawn from this lever the feelers are released against the inner sides of the cylinder. A support is provided to hold Federal Test the apparatus in posiing Gage for tion, the support being

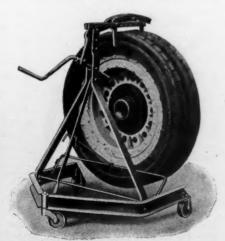
placed at the mouth of the cylinder and having three fingers which bind firmly against the cylinder The centralizing fingers are operated by the hand wheel. Any variations from the correct dimensions are indicated by a movement of the dial hands.

Cylinders



The new Atlas Wheel Crane, distributed by the Thomson Auto Specialties Co., Columbus, Ohio, is designed not only to facilitate speed in handling, but also to relieve the repairman of the arduous work of manually transporting the heavy items about the shop.

The operation of the crane is simple. Brought up to the wheel, the grab hooks reach in under the fender and grip the rim on either side of the wheel. A turn



This Crane Permits of Quick Wheel Removals

of a crank is all that is necessary to lift the wheel so that it hangs free. crane and the suspended wheel are then rolled back from the truck. An adjustable stop on the crane holds the wheel in a vertical position so that when repairs or adjustments are completed, the wheel is slipped back into place in the same easy fashion and the grab hooks released.

The Atlas wheel crane is of sturdy construction. All parts except casters are of forged, machine or channel steel. They are built much stronger than necessary, for the crane is designed to lift a ton. The action of the grab hooks is claimed to be positive. The use of the crane is said to eliminate all danger of injury to men or of damage to bearings or brake linings, so common when this job is done by hand. The crane is adjustable to any size of wheel or tire, and can be used in any clearance between wheel and fender or body. Special grab hooks are supplied for pneumatic tires.

The price is \$80.00 f.o.b. Columbus. Special grab hooks for use with pneumatic tires are \$6.00 extra.

### Whitcomb Valve Grinder

A manually operated valve grinder, known as the Whitcomb Valve Grinder, is being offered to the trade by the American Radio & Research Corp., 21 Park



Row, New York City. One of the features of this product is its accessibility enabling its operation in close quarters. It is operated by a continuous cranking motion. In addition to the three bits with which it is furnished and which will handle practically all the valves on the market, the chuck mechanism is such that the operator can utilize any special bits desired.

This tool, weighing about 3 lb. operates easily which is probably due to the fact that the principal bearings are of the cup and cone type. The lubricant gains ingress to the internal mechanism through one oil hole. The active mechanism is simple and housed in an aluminum case that is oil and dust proof and the bearings which are subject to wear are adjustable. The price is \$15 retail.

### Allen No. 1 Soldering Tool

A new combination tool, the Allen No. 1 Gas Soldering and Blow Torch and Branding Tool, is being manufactured by the L. B. Allen Co., Inc., 4517 N. Lincoln St., Chicago, Ill. The various parts of this tool are standard.

feature makes it possible to secure any of the parts at any time. It is claimed that the tip will start hot while working and that the handle being thoroughly insulated will not transmit the heat to the handle. Flexible brass, steel, solid rubber or woven gas hose, in any length, can be obtained from the maker if desired. The gas feed pipe is through the handle.

A blue flame is discharged when lighted, the force being supplied by gas. It forms a convenient tool for painters and for brazing and similar purposes. The blow torch is converted into a soldering tool by attaching the combustion chamber to the Torch.
torch with the set
screw. The copper tip can then be locked



Combination Gas Soldering Iron and Blow

securely into the end of the combustion chamber by the bayonet catch. If this tool is to be used as a branding tool, the branding tip is inserted instead of the soldering tip.

### Ross Wheel-Truing Tool

A new wheel-truing tool designed especially for straight-faced wheels is the product of the Ross Mfg. Co., Cleveland, Ohio. This tool includes a hardened steel cylinder in which are cut two series of deep diagonal slots cut at right angles to each other. The bearings are inclosed and are easily adjusted. Their position in relation to the cylinder being such as to prevent vibration, permitting perfect functioning of the tool. This tool can be accurately set by consulting the graduated



Tool Designed Especially for Straight-Faced Wheels

scale on either side of the cylinder and adjusting two hold-down bolts accordingly. When this tool is applied to the wheel, very little grinding action on the tool surface is said to result, as both the surfaces move at the same speed. For rougher grades of work or for roughing fine wheels preparatory to finish-truing, other types of dressers are obtainable.

### New Connecting Battery Clip

A new battery charging clip designed particularly for use in the electric battery service station is being marketed by Chas. F. Hartung, Higgins Bldg., Los Angeles, Cal. This clip is not only constructed of good grade acid resisting bronze, but is also lead coated to give additional protection against chemical reaction. It is a one-piece clip and the fact that it has

### Bearing, Babbitting and Boring Tool

A new outfit for babbitting new bearings and boring them has been brought out by the Storm Mfg. Co., Thompson,



The accompanying illustration shows the boring tool in place and the babbitting tool above it. These tools will bench, allows this device to be used as an arbor press, taking work up to 8 in. in diam. It also can be used for removing wood and wire automobile wheels, generator couplings, pressing bushings, etc. It is sold through the Zinke Company, 1323-1325 Michigan Blvd., Chicago, Ill., sales agents, at the following prices: No. 4, complete with press plate, \$32; No. 3, without press plate, \$28; No. 2, small size, including rings, \$10; No. 5, small size, without rings, \$8.

### Combination Press and Vise

A new device which is particularly useful about service stations is being offered to the trade by the Motor Machine Corp., Reliance Bldg., Kansas City, Mo.

This device is a combination press and vise and is composed chiefly of two



no springs is an additional assurance against accidental disconnection. The teeth in the jaws are pointed to insure a good connection. These jaws may be caused to open 11/2 in. and the clip is so shaped that no matter how close the connections they cannot short circuit. Additional terminal for the wiring connection is also provided.

### Bruhn's Jack

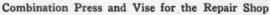
A new universal jack has been added to the Bruhn line by the Bruhn Mfg. Co., 1248 Jefferson St., Hammaton, Ind. It is the Double Eccentric Adjustable Jack and not only fits all automobiles but can be operated quickly and easily. It is of high-grade of iron and has a telescoping movement which provides adjustment for different heights. The frame is heavy angle-iron and the casters are roller type. The handle has a lock. Cars can be turned completely around within their own length and the jack can be used in the front or rear of the car. The price of this jack is \$16.



Double Eccentric Adjustable Bruhn

It fits all cars and is quickly and easily operated

Quick Connecting Bat-tery Charg-ing Clip.



greatly assist in making new bearings, the same as the original and in the proper position. A substantial jig is provided for holding both the babbitting arbor and the boring bar so that proper position and alignment will be insured. The babbitting arbor has pouring blocks and has ample space for the running in of the metal, the surplus being cut away by the boring bar, which has four cutting edges for each bearing. This outfit for the Ford car sells at \$80 and for the Fordson tractor \$95.

### F. & W. Universal Wheel and Gear Puller

This combines in one tool a device which can be used for pulling various types of wheels, gears or pulleys, and is manufactured by the F. & W. Mfg. Co., Indianapolis, Ind. The disk is made of a special malleable alloy.



F. & W. Combination Puller

The power screw, of 7/8 in. diam. with No. 14 thread, gives powerful leverage without danger of stripping the threads. It is made in several different sizes and Nos. 3 and 4 can be used on practically all jobs. The press plate No. 128, which may be held in a vise or bolted to the

parallel iron rods, threaded at both ends to receive two head ends, upper and lower, which are secured on the rods by nuts. The head is provided with an opening wherein is cut square threads to receive and accommodate a drive arm which is provided with a square thread and operates against the shaft. Portability is one of the features of this device as it may be carried here and there with ease. This device will take a shaft of any length and the reversibility of the jaws with one side forming an ordinary vise and the reverse side formed to accommodate circular objects such as cylinders, enables this to be utilized for all types of ship work. Another feature is the jaw for the pulling of Ford transmission gears.

The rods and jaws are of gray iron and drive arm heads of steel. A clear space of 81/2 in, allows the admission of the Ford transmission, when it is used for the purpose of driving off the gear. This vise weighs about 170 lb. and retails at \$50 f.o.b. Joplin, Mo.



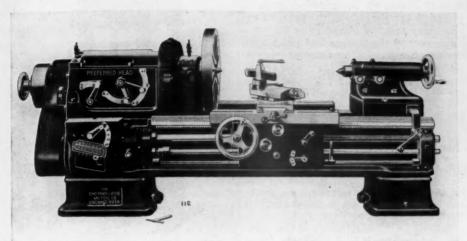
New Tread Roller, Peeler and Applier This new device combines a tread roller that will apply and roll down a built-up tread in one operation, and a tread remover that will remove the old tread from the tire to be rebuilt. It is manufactured by the Western Tire & Rubber Works, Chicago, Ill.

### Cincinnati Geared Head Lathe

The Cincinnati patented geared head lathe, one of the latest products of the Cincinnati Lathe & Tool Co., 3207 North St., Oakley, Cincinnati, O., may be obtained in either the single pulley or motor drive type.

Lafayette Sts., New York City, are for radiator repairs of all kinds.

The test stand has a gage and safety valve for air tests enabling the establishment of a definite pressure without jeopardizing the radiator to any damage due to over pressure. The testing tank will accommodate radiators of all makes. It



Latest Type Cincinnati Geared Head Lathe is Furnished With Either a Single Pulley Belt Drive or Motor Drive

The single pulley belt type drive receives its power in the conventional manner, from a line shaft without the countershaft. In the other type the motor is mounted optionally, either on the head stock or in the rear of the cabinet leg. Power is transmitted direct through belting, solid chains, or gearing. As the variations are obtained in the head, only constant speed motors are required.

Various speed changes are brought about by the manipulation of levers in the front.

Twelve different speeds may be obtained by various gear ratios. At the apron is a control by which the spindle can be stopped, started or reversed without stopping the overhead works or the motor.

The spindle is a high carbon crucible forging and carries a face gear. The intermediate gear has three sliding gears that mesh with the back gears which in turn carry a pair of sliding gears and three stationary gears of different diameter. These gears are heat treated steel forgings, or high carbon nickel steel, bronze bushed throughout. The teeth are rounded and only the gears actually in use are in mesh. The splash system of lubrication is employed, and included in this system in an indicator by means of which the exact amount of oil in the base of the head can be immediately deter-

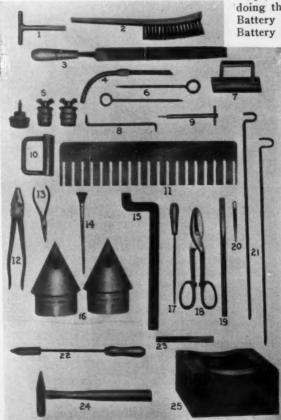
Standard equipment such as taper, draw-in, chucks, lathe tools, etc., can be added at any time.

### Radiator Repair Stand and Outfit

The Fairbanks Radiator Test Stand and Radiator Repair Outfit, products of the Service Station Equipment Co., 3701 S. Ashley Ave., Chicago, Ill., and marketed by the Fairbanks Co., Bloom and

can also be utilized as an inner tube protector.

The test stand and the repair outfit, which include all the tools necessary in radiator repairs, is designed to fulfill the requirements of this line of work. The test stand sells at \$65 and the radiator repair outfit is listed at \$30.



Showing Each Individual Part That Makes Up the Service Radiator Repair Outfit

It is the product of the Service Station Equipment Co., Chicago, Ili.



View of the Service Test Stand for Radiators Equipped With Gage and Safety Valve

### Battery Drill and Battery Charging Connection

Two items that are being produced by the Larson & Lundberg, 317 N. Main St., Kewanee, Ill., which should be of interest to the battery and electrical repair shops, and service stations and garages doing this kind of work, are the L & L Battery Charging Connection and the Battery Drill.

The battery charging connection is a simple outfit arranged to fit practically any battery terminal. It is composed of lead and high-tension cable, no bolts, springs or iron of any description being used in its makeup. With this a strong and constant connection can be made without the possibility of accidental disconnection and without marring or making marks of any kind on the terminal itself. The price in lots of 12, complete with wire and terminals is \$.75 each.

The L & L Battery Drill is used for drilling off the battery strap without drilling away the battery post. It is arranged to take a 1/32 in. cut and is easily operated. drill which sells at \$10 is complete with a holder, two cutters, a plunger, a spring and a special center punch. The handle and plunger of the drill are made of mild steel, but the bit proper is of high grade tool steel and the cutting edge is on an angle so as to cut the lead like a shaving. The price includes two cutters and a handle.

### Electro Trouble Detector and Hyrate Cadmo Reader

The two new devices, namely, the Hyrate Electro Trouble Detector and Hyrate Cadmo Volt Reader, introduced and manufactured by the Service Station Supply Co., 30 E. Larned St., Detroit, Mich., are items of equipment that should be of utmost interest to the garage men in electrical and battery stations.



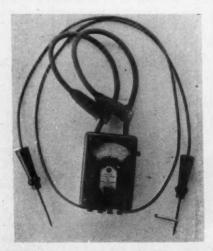
Hyrate Cadmo Volt Reader

Determines the condition of either or both groups of positive and negative plates

The trouble detector enables the repair man to determine the cause of any defect or failure of the generator, starting motor, lights, horns, etc., not functioning properly. The tests are simple and are readily made. The instrument is a combined voltmeter and ammeter with three voltage and two amperage scales for testing any electrical pressure of current in truck and automobile equipment. This device includes the leads to the prods, clips and cadmium electrodes. A small switch at the side of the instrument converts it into either a voltmeter or an ammeter.

The price is \$42.50.

The Hyrate Cadmo Reader determines the most exact condition of positive and negative plates and also the polarity and low voltage readings of any single cell irrespective of size or capacity. Two



Hyrate Electro Trouble Detector It is a portable, self-contained electrical testing instrument

scales are provided on this instrument. One for cadmium and the other for voltage. The stationary contact spike, the supporting clip and the conductors, etc., are integral.

When making a cadmium test, the supporting clip is placed on a positive post and when information concerning the voltage is desired, the cadmium stick is placed in the electrolyte, the point of the stationary spike is placed upon the positive post and the flexible lead point upon the negative post. The accompanying illustration shows the Cadmo reader can be attached to one of the connectors, leaving one hand free to record the reading.

The price of the Cadmo reader is \$16.50.

### Manley Utility Garage Crane

A general all-purpose crane for lifting, no matter what the type of work may be for garage, or for outside work, in wrecking, towing and lifting, is the product of the Manley Mfg. Co., York, Pa.

Because of the adaptability of this portable floor crane, it is a decidedly useful asset to any garage or repair shop. In its complete form, with the portable base, it is a combination of a portable floor crane and wrecking crane.

If used as a wrecking crane mounted on a truck, it has a capacity of 2 tons with beam overhang of 42 in. and only requires a resting space 36 x 24 in. As this crane is constructed in four individual units, it can be readily knocked down or assembled for transportation. It weighs 400 lb., and the price is \$113.



Manley Utility Garage Crane for Use in the Garage or on Trucks

As a portable floor crane for inside uses, it has a capacity of 1½ tons. This model, which is a combination portable floor crane and wrecking crane, is so constructed that it has a beam overhang of 36 in., high lift of 7 ft., and a low base. Except for the gears, which are of cast iron, and the base, which is of seasoned white oak, the construction is of steel throughout. It weighs 500 lb. and the list price is \$125.

### Manley Garage Presses

The 22-ton line of presses made by the Manley Mfg. Co., York, Pa., are produced in various sizes. These presses have the characteristic Manley features—high

power leverage, high-speed high-power leverage, range, capacity, adaptability, the exposed screw which may be struck in extreme cases when pressure fails, quick changing tables, bolted construction, etc.



New Manley Press
This shows the 42 in., 22-ton press equipped with the high-speed rack and pinion press attachment and test centers. It is useful for light work, bushing, pins, etc.

They are throughout of heavy steel channels rigidly bolted together. The following are other exclusive features of these presses: The high power ratchet leverage of 2200-5000 to 1 for heavy work, which is powerful and gives tremendous pressure. Change in leverage can be instantly made to the high-speed, high-power sensitive leverage of 1000 to 1 for light work, which is quick, saves time, effort and possible damage to work. It is particularly desirable for straightening work. The horizontal stroke has more power, and a man can pull more than his weight. The 42-in. press takes in truck wheels with solid tire. The tables are a unit construction, and position is quickly changed by removing two pins. They have no bolts or nut, but have wide surfaces to properly support work, screw 2 in. in diam., 4 pitch acme thread, 12-in. travel and does not

The channel blocking is braced and the V face plate automatically adjusts itself to any size shaft or hub, the bolt construction makes it possible to admit frame, etc., under screw to straighten, while the screw exposed at the top may be struck a blow in extreme cases when the pressure alone fails. Test centers converting any Manley press into a straightening press can be supplied at small cost, while the rack and pinion high-speed press can also be obtained for attachment on any Manley press.

The complete equipment furnished with each press is as follows: Operating lever, 2 braced channel blocks, V face plate with capacity up to 3 in., V nose for screw, vise block, extension piece for screw for lower table work, threaded tie rod. The 32-in. and 36-in. presses have the same equipment with the exception of tie rod and extension piece for screw, which are

# Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

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|              | Piston Rings Carburetor Service Emergency Length | Model, Thickness Model, |

BRAKE LINING

Over All

Back of Driver's Seat

Thickness
No. of Pieces
Width

Thickness No. of Pieces 

## Replacement Table—Continued

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|        |                 | Name, Model, Tonnage<br>and Year | Harvey WEA-114—1919-20 Harvey WHA-214—1919-20 Harvey WHA-324—1919-20 Harvey WHA-324—1919-20 Harvey WHA-324—1919-20 Hawkeye M-2 Hendrickson 1-24 Highway-Knight B-5 Highway-Knight B-5 Highway-Knight B-5 Hendrickson 1-24 Hendricks  |
| ME     | Width           | Over All                         |   |
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| GINE   | Carbu           | Outlet<br>Diameter               | AMANA A 4-1-200 - AMANANANANA MANANA MA MANANANANA MANANANAN  |
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|        |                 | Name, Model, Tonnage<br>and Year | Double-Drive C-1½  Douglas 1½  Eagle 100-2  Ellaworth 25A-½-1918-20  Ellaworth 25A-½-1918-20  Fageol 4500  Fageol 4500  Fageol 4500  Fageol 4500  Fageol 1½  |
|        |                 |                                  |   |

| ME     | Width           | Over All                         | \$4888488888888888888888888888888888888  |
|--------|-----------------|----------------------------------|--|
| FRAME  | Length          | Back of<br>Driver's<br>Seat      | #17128#3225455565452565#4444524565656565656565656565656565656565   |
| T      |                 | No. of Pieces                    |  |
|        | ney             | Тріскпезя                        |  |
| ا      | Emergency       | Width                            |  |
| LINING | En              | Length                           | 202020440205   |
| 3      |                 | No. of Pieces                    |  |
| BKANE  | Service         | Thickness                        | CHARKKAHARIKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK  |
| -      |                 | Width                            | · · · · · · · · · · · · · · · · · · ·  |
|        | 02              | Length                           | ::54cc4444655464141416566656777465666666666666   |
| Ť      | etor            | Inlet<br>Diameter                | ANAMA TANAMA TAN |
| ENGINE | Carburetor      | Outlet<br>Diameter               | ARREST ARREST ARRESTS ARRESTS ARREST ARREST ARREST   |
| ENC    | Piston<br>Rings | 43Бі W                           | **************************************   |
|        | Pia<br>Ri       | No. per Cyl.                     | <b>₮</b> ₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱₱  |
|        | l.              | Name, Model, Tonnage<br>and Year | Noble C40-2—1919-20.  Noble D50-2½—1919-20.  Noble D50-2½—1919-20.  Noth way B2-3½  0. K.—1½—1919.  Old Heikoby B2-2.  Old Heikoby B2-2.  Old Reliable B-2½—1918-20.  Oneida B-9-2  Packard C. E. E. Packard C. E. Packard C. E. Packard C. E. E. Packard C. E. E. Packard C. E. E. Packard C. E. E. Packard C. E. Packard C. E. Packard C. E. E. Packard C. E. E. Packard C. E. E. Packard C. E. E. Packard C. E. E. Packard C. E.  |
| FRAME  | Width           | Over All                         | 80000000000000000000000000000000000000   |
| FR     | Length          | Back of<br>Driver's<br>Seat      | 25   |
|        |                 | No. of Pieces                    | N  |
|        | gency           | Тһіскпевв                        | * : * : : : : : : : : : : : : : : : : :  |
| ING    | Emergency       | Width                            | d oponuoud ganuuu aganuuuu aganuu aganuu agan a oooo adadadada agan agan agan agan agan agan   |
| LINING |                 | Length                           | 5  |
| BRAKE  |                 | No. of Pieces                    | α ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;  |
| BR     | Service         | Тріскпева                        | # : ##################################   |
|        | Ser             | Width                            | d Addition of the property of  |
|        | -               | Length                           | 6  |
| 1E     | Carburetor      | Diameter<br>Inlet<br>Diameter    | HANNERS TE STATE SOUNDED HER HANNERS STATE |
| ENGINE | -               | Outlet                           | HANNAN X HANNA HAN ANNANANANANANAN ANNANAN HANNANAN  |
|        | Piston<br>Rings | No. per cyl.                     | ರ :  |
|        |                 | Name, Model, Tonnage<br>and Year | Kiesel-Goliath-5—1919–20 Kiesel-Goliath-5—1919–20 Kielber 13 Kielber 14 Kielber 14 Kielber 14 Kielber 14 Kielber 24 Kielber 24 Kielber 25 Kielber 26 Knox 36—1915–20 Kochler M 254—1919–20 Larabee-Deyo U-19-1919–20 Larabee-Deyo U-19-1920 Larabee-Deyo U-19-1920 Larabee-Deyo VI-1919–20 Larabee-Deyo VI-1919–20 Larabee-Deyo VI-1919–20 Larabee-Deyo VI-1919–20 Luckinghaus K2—1919–20 Maccar H-134—1919–20 Maccar |

ength Width

FRAME

## Replacement Table—Continued

| 3            |                 |                                  |  |
|--------------|-----------------|----------------------------------|--|
| FRAN         | Length          | Back of<br>Driver's<br>Seat      | 22222222222222222222222222222222222222   |
|              |                 | No. of Pieces                    |  |
| 0            | eney            | Тріскиева                        | **************************************   |
| NG           | Emergency       | Width                            | . wanda-unda-unda-unda-undanga-undanga   |
| BRAKE LINING | H               | Length                           | 22 223 22 25 25 25 25 25 25 25 25 25 25 25 25  |
| KE           |                 | No. of Pieces                    |  |
| BR/          | rice            | Тріскпевв                        | :在我就中中中中在我就在中中在我就是中中中在我就就是中中中的我就是  |
|              | Service         | Width                            | wassessessessessessessessessessessessesse  |
|              |                 | Гепер                            | 248683322222008637444045747474757575757575757575757575757  |
|              | retor           | Inlet<br>Diameter                | 22   |
| ENGINE       | Carburetor      | Outlet<br>Diameter               | COLUMN TO THE TANK A TA |
| EN           | Piston<br>Rings | Width                            | XX +++xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  |
|              | E. E.           | No. per cyl.                     |  |
|              |                 | Name, Model, Tonnage<br>and Year | Triumph 1 ½  |
|              | д               |                                  |  |
| FRAME        | Width           | IIA 19VO                         |  |
| FR           | Length          | Back of<br>Driver's<br>Seat      | 241212000000000000000000000000000000000  |
|              | A               | No. of Pieces                    | ###QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ   |
|              | ergensy         | Thickness                        | ++x:::+xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx   |
| ING          | Emer            | Width                            | ರಾಣಕುರುರುವಿನು ನಿರುದ್ದಿಗಳ ಸಂಪಾರಿಸುವ ಸಂಪಾರಿಸುವ ಸಂಪಾರ್ಣವಾಗುವ ಪ್ರಾವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರ<br>ಪ್ರಾವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರಾವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ ಪ್ರವಾಣಗಳ  |
| LIN          |                 | Length                           | 2011-101-1011-1011-1011-1011-1011-1011-  |
| BRAKE LINING | r               | No. of Pieces                    | a44aaaaaaaaaaaaaaaaaaa4444∞∞∞∞∞aaaaaaaa  |
| BR           | Service         | Тріокпевв                        |  |
|              | Sa              | Width                            | and and a control of the control of  |
|              |                 | Length                           |  |
| E            | Carburetor      | Inlet<br>Diameter                |  |
| ENGINE       | -               | Outlet<br>Diameter               | XXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX   |
|              | Piston<br>Rings | No. per Cyl. Width               | manaanamananan : oo o   |
|              |                 | Name, Model, Tonnage<br>and Year | Schacht 234   Schacht 234   Schacht 234   Schacht 334      |

Stn-Stanweld

M & E-Merchant & Evans

W-Westinghouse

H—Honeycomb

Kel-Kelsey

# Used in the Specifications of Commercial Cars Listed on the Pages Following KEY OF ABBREVIATIONS

In All Specifications { O-Own Q-Optional

\*-Pneumatic Size of Tires: +-Dual LMF-Light Mfg. & Fdy. Lyco-Lycoming Hink—Hinkley H-Sp—Herschell-Spillman Lib—Liberty GBS-Golden, Belknap Radiator (Make or Type) : Can—Candler Chic—Chicago EM—English-Mersick Bur—Bureka Fed—Fedders Flex—Flexo C-Centrifugal Pump GO-G. & O.
Har-Harrison
Hoo-Hooven
Idl-Ideal
Jam-Jamestown
Liv-Livingston
Lig-Long
McC-McCord
May-Mayo
Per-Perfex
R-T-Rome-Turney
Spar-Spartan
Spec-Special
Spi-Spirex
Stan-Standard
C-Celular
T-Tubular P-Water Pump T-Thermo-Syphon Cont-Continental Valve Arrangement: Wau-Waukesha Rut—Rutenber Ster—Sterling Vict—Victory Wis-Wisconsin Her-Hercules G-Gear Pump Beav-Beaver L-ELL-Head T-TEE-Head I-Overhead How Cooled: Bus-Bush S-Sleeve Swartz

B—Force and Splash C—Centrifugal Pump G-Force and Gravity Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler NE—North East POL—Prest-O-Lite Sim—Simms Spi—Splitdorf AtK-Atwater-Kent B&B-Ball & Ball G—Gray & Davis E—Leece-Neville N—North East R—Wagner Con-Connecticut -Force Feed Aul.-Auto-Lite Ens—Ensign Flch—Flechter Bent-Bennett John-Johnson Ignition System: Fis-Eisemann Mag-Magneto Till-Tillotson Kin-Kingston Holl-Holley G—Gravity
P—Pressure
V—Vacuum Cart-Carter Engine Starter: Bat-Battery Ber-Berling Zen-Zenith L-Auto-Lite Del-Delco Lubrication: Bos-Bosch S-Splash Carburetor: D-Dyneto P-Pump Aer-Aero Fuel Feed: B-Bijur

Chi-Chicago Cl-Clark Emp-Empire Hind-Hindley Own D-Dead, Own design Pet-Peters %-EI-%-Elliptic S&C-Semi and Cantilever S&%-Semi and %-Elliptic UM-Universal Machine UP-Universal Products 1/2-FI-Semi-Floating 3/4-FI-% Floating Torb—Torbensen W-M—Weston-Mott Wis—Wisconsin W-Westinghouse SP-Spring Perch US-United States S-El—Semi-Elliptic Elip-Full Elliptic Thom-Thomson Tim-Timken Cham-Champion Ther—Thermoid GC-Garden City Rock-Rockford Kal-Kajamazoo Cant-Cantillever Sals-Salisbury Mar-Maremont Stan-Stan-Par Per-Perfection Stan-Stan-Par Ster-Sterling Nat-National Row-Rowland Badg-Badger Shel—Sheldon Flot-Floating Hig-Higgins Math-Mather Shel-Sheldon Dit-Ditwiler Ster-Sterling Russ-Russel Tem-Temme -Savage Spic-Spicer Det-Detroit Mer-Merrill Lah-Laher Tut-Tuthill Cel-Celfor Rear Axle: Springs: MM—Mechanics Mach. Co. Munc—Muncie Plan—Planetary G-Detroit Gear & Mach. H—Hartford L—Brown-Lipe M—Merchant & Evans (Hele-Shaw) A—Amidships R—Rear U—Unit with motor UJ—Unit with jackshaft Location of Transmission: C—Chain E—External Spur Gear D-Sea-Driggs-Seabury N-Concentric Spur P-Spur R-Double Reduction Bld-Blood Brothers KB-Kinsler-Bennett G-Lee-Grant Lees B-Li-Brown-Lipe B-Borg & Beck Mech-Mechanics Rock—Rockford Selec—Selective Dun-Dundore Durst-Durston I-Internal Gear S-Spiral Bevel W-Worm Warn-Warner Hart-Hartford B-Bevel Gear Covt-Covert Full-Fuller Flex-Flexite W-Warner Fransmission: Det-Detroit E—Detlaff F—Fuller Cott-Cotta Acm-Acme U-Muncie V-Covert Final Drive: F-Friction D-Disc Jniversal:

Steering Gear: CAS—C. A. S. Products Co. Gem—Gemmer W&L-Waterhouse & Les-Hoo-Hoopes Brothers E&O-Eberly & Oris AuW—Auto Wheel Bim—Bimel Cont-Continental Simp—Simplex Wau—Waukesha Warn-Warner Wohl-Wohlrab McC-McCanna Arc-Archibald Roy—Royer Rus—Russell Sal—Salisbury Sch—Schwartz Smi—Smith Rim Equipment: Bak—Baker Det—Detroit C-Centrifugal Hink-Hinkley Mon-Monarch Gdy-Goodyear Rug-Ruggles StM-St. Mary Fir-Firestone Del-Delaney Sta-Stanwell Pru-Prudden Stn-Standard Lav-Lavine Dup-Duplex Mer-Merrill Pier-Pierce Day-Dayton Mil-Military Hay-Hayes Ross-Ross Det-Detroit Kel-Kelsey Jac-Jacox -Jones W-Worm Cla-Clark Governor: Wheels:

# Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. GasolineTractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(All New Models and Changes in Current Models Are in Heavy Type)

(Where prices are not given it is because we have been unable to get them from authoritative sources)

| Pr. Cent of Weight<br>on Rear Wheels       | .160                        | 650   |             | 665<br>655<br>657<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70   |       | 85.<br>775<br>85.<br>85.<br>85.<br>85.<br>85.<br>85.<br>85.<br>85.<br>85.<br>85   |
|--|-----------------------------|---|-------------|---|-------|---|
| Rim Equipment                              | :                           | Kel<br>Det<br>Fir   |             | Fir   |       | Opt Rich Rich Rich Rich Rich Rich Rich Rich   |
| Wheels-Make                                | Pru                         | Kel<br>Sal<br>Hoo<br>Hoo  |             | Wan<br>Own<br>Own<br>Pru<br>Sth<br>Wan<br>Hay   |       | Bim<br>Bim<br>Hay<br>Hay<br>Ect<br>Sch<br>StM<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim<br>Bim   |
| Оочетног                                   | - :                         |   |             | Mon<br>Mon<br>Mon<br>Mon  |       | Wau<br>Dup<br>Pier<br>Pier<br>Own<br>Own<br>Pier<br>Simp<br>Pier<br>Simp  |
| Wheelbase                                  | 1 921.                      | 1114<br>108<br>104<br>1108<br>127   |             | 118<br>125<br>125<br>120<br>134<br>134<br>115<br>115<br>116<br>116<br>116<br>117<br>117<br>117<br>117<br>117<br>117<br>117  |       | 142 W<br>130 D<br>130 D<br>130 D<br>124 D<br>124 D<br>125 D<br>125 D<br>126 D<br>128 D |
| Steering Gear                              | Own                         | Own<br>Own<br>C.A.S.  |             | CAS<br>Ross<br>Nav<br>Jac<br>Cas<br>CAS<br>CAS<br>Gem<br>Own  |       | Ross Ross Ross Lav Lav Lav Ross Ross Wass Ross Ross Ross Ross Ross Ross Ross R  |
| Rear Tires                                 | 28x3                        | 33x4<br>30x33/5*<br>28x33/5*<br> 31x4*<br> 22x4/5*  |             | 32x4 /4<br>35x5<br>35x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x6<br>36x6   |       | 36x5<br>32x4<br>32x4<br>32x4<br>33x3/<br>32x4<br>32x4<br>33x6<br>35x6<br>34x5<br>34x5<br>34x5<br>34x5<br>34x5<br>34x5<br>34x5<br>34x5   |
| Ront Tires                                 | 28x3                        | 33x4<br>30x3½*<br>28x3½*<br>31x4<br>32x4½*  |             | 32x4 / 4  |       | 36x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>31x4,4<br>32x3,4<br>32x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34x3,4<br>34  |
| Springs                                    | Tut                         | S & %<br>Shel<br>Own<br>Shel<br>Shel  |             | Row<br>Math<br>Tut<br>Det<br>Det<br>Shel<br>Shel<br>Per<br>Pen<br>Math<br>Det<br>Det  |       | Det<br>Det<br>Det<br>Det<br>Det<br>Hig<br>Per<br>Per<br>Per<br>S'El<br>Skan<br>S'El<br>Skel<br>S'El<br>Skel<br>S'El<br>Skel<br>S'El<br>Skel<br>S'El<br>Skel<br>S'El<br>S'El<br>S'El<br>S'El<br>S'El<br>S'El<br>S'El<br>S'E  |
| -9H 169D latoT<br>wod ni noitsub           | 12.25:1  Tut                | 19.41:1   |             | 16.4:1<br>115.1<br>21.9:1<br>25:1<br>23.9:1<br>16.31:1<br>18.06:1<br>18.6   |       | 33:11<br>18:11<br>18:11<br>2.5:1<br>15:75:1<br>20:25:11<br>24:1<br>22:9:1<br>19:5:1<br>10:3:1<br>21:8:1<br>3.5:1  |
| Total Gear Re-<br>dgiH ni noitoub          | [4.25:1                     | 4.16:1<br>4.75:1<br>3.6:1<br>5.5:1  |             | 58.88.1<br>6.1<br>7.1<br>7.1<br>7.2<br>7.2<br>7.2<br>7.2<br>7.2<br>7.2<br>8.6<br>6.6<br>1<br>8.6<br>6.6<br>1<br>8.6<br>6.6<br>1<br>8.6<br>1<br>8.6<br>1<br>8.6<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>8.7<br>1<br>1<br>1<br>1<br>8.7<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1  |       | 8 25:1<br>8:1<br>8:1<br>6:5:1<br>6:5:1<br>18:25:1<br>7 7:1<br>7 7:1<br>7 7:1<br>7 7:1<br>7 7:1<br>7 6:1<br>7 6:1<br>6:5:1<br>6:3:1<br>6:3:1   |
| Rear Azle                                  | Own                         | Flot<br>Gem<br>%-Fi   |             | Hess<br>Stan<br>Dead<br>Wis<br>Own<br>Torb<br>Timk<br>Own<br>Timk<br>Cli<br>Flot<br>Cli   |       | Timk Timk Torb Torb Col   |
| Final Drive                                | 0                           | ME ME   |             | B-B-BB-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B  |       | **************************************  |
| IssrevinU                                  | Dead                        | Own Stan Ther Spic Spic   | ds          | Arv<br>Spic<br>Bild<br>Own<br>M&E<br>Hart<br>Hart<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own   |       | Bild Bild UP UP UP Bild Bild Bild Bild Bild Bild Bild Bild  |
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| Speeds Forward                             | Pou                         | <u> </u>  | Po          | <b>∞</b> ₩ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞  | Ĭ     | 0000000000 00 00 000000000000000000000  |
| noissimsasaT                               | 800  <br> Frie              | Selec<br>Selec<br>Selec<br>Selec<br>Selec   | 1500        | Selec<br>Own<br>Selec<br>Covt<br>Own<br>Own<br>B-Lic<br>Own<br>B-Lic<br>Own<br>B-Lic<br>Own<br>B-Lic<br>Own<br>B-Lic<br>Own<br>B-Lic<br>Own<br>Selec<br>Selec<br>Selec<br>Selec<br>Selec<br>Covt<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own<br>Own  | -     | Full Full Full Full Full Full Full Full   |
| Engine Starter<br>Clutch                   | -:                          | AD ₹DD  |             | MWOUDUM TOUCHWEU  |       | MADACOMACOM HAPACHA   |
| Ignition System                            |                             | Z4 :::  |             | Man : CO : COM  |       | :0 :0 :A : : ma : : : : : : : : : : : : : : : :   |
| Fuel Feed                                  | AtK                         | Con<br>Opt<br>Atk   |             | Atk<br>Bos<br>Bos<br>Eis<br>Bos<br>Bos<br>Ber<br>Au<br>Sim<br>Rem<br>Bos<br>Eis<br>Bos<br>Con<br>NE   |       | Eise Sim Aut Con Bos Con Bos Con Bos Con Bos Con Bos Con Bos Con Con Bos Con  |
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| Carburetor                                 | B  Strm  G                  | Stew Cart Holl  |             | Sheb<br>Zen<br>Rayf<br>Mar<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen<br>Zen  |       | Mar<br>Strm<br>Strm<br>Strm<br>Strm<br>Strm<br>Strm<br>Strm<br>Str  |
| Make of Type                               | <u>B</u>                    | MWWWWW  |             | wrrwrm : m :wmmmvm  |       | waarwaa : awwaawaanaa   |
| Radiator<br>Page to Type                   | H                           | Mec<br>Nec  |             | Liver Cown Cown Cown Cown Cown Cown Cown Cown   |       | Med Control That The Control C  |
| Valve Arrange't How Cooled                 | H                           | OHHHH   |             | HHHOHOHHHHHO  |       | אַרַאַרַאַרָּטָרָ: יַטָּרָאַרָּאַרָּ  |
| Нотѕероwег                                 | 112.1 1                     | 24.1<br>16.9<br>15.6<br>14.4<br>14.4<br>14.4  |             | 19.6   L<br>222.5   L<br>222.5   L<br>222.5   L<br>19.6   L<br>16.9   L |       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Bore and Stroke                            | 800  Own  2%x4  12.1 L  T H | 33,78 x 8<br>33,78 x 8<br>33,78 x 8<br>3,48 x 8<br>3,44 x 8<br>4,44 x 8 |             | 200 200 200 200 200 200 200 200 200 200   |       | 24444444444444444444444444444444444444  |
| Engine—4 Cyl.<br>unless otherwise<br>noted | Own                         | 1990   1085   Own   2100     Lyco   120   1095   Own   2120   1350   Own  |             | Lyco<br>Own<br>Wis<br>Cont<br>Lyco<br>Cont<br>Cont<br>Cont<br>Cont<br>Cont<br>Cont<br>Cont<br>Con   |       | And and a second and a second   |
| Chassis Price                              | :                           | 1085<br>1095<br>1350  |             | 1595<br>1750<br>1750<br>1350<br>1385<br>1385<br>1385<br>1385<br>1385<br>1385<br>1380<br>1360<br>1360  |       | 2400<br>2175<br>1175<br>1175<br>1175<br>1175<br>1175<br>1175<br>1185<br>118   |
| Chassis Weight                             | 1 800                       | 2120<br>22250   |             | 2800<br>2800<br>2800<br>2800<br>2800<br>2800<br>2800<br>2800  |       | 38550 2400<br>2800 1795 1<br>2800 1595<br>2800 1595<br>2910<br>2910<br>2940 1325<br>3400 2186<br>3200 1850<br>3200 1850<br>3200 1895<br>3300 1895<br>3300 1995<br>3100 1995<br>3100 1995<br>3100 1995   |
| Model                                      | 800 Pounds                  | 1000 Pounds Dodgs. Ellsworth 25A Ellsworth 25A Vim 27. Vim 28.  | 1500 Pounds |   | 1 Ton | ian A<br>Greyo A<br>Greyo A<br>A 32X<br>E 20<br>20  |
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| 98000000000000000000000000000000000000   | 888.55<br>880.55<br>880.55<br>880.55<br>880.55<br>880.55<br>880.55<br>880.55<br>880.55   | 7685  | 8250855: 188028825: 2: 188238750885: 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18803885* 3: 18808885* 3: 1880885* 3: 1880885* 3: 1880885* 3: 18808885* 3: 1880885  |
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| 20:11<br>20:6:1<br>20:16:1<br>29:97:1<br>22:75:1<br>18:6:1<br>22:5:1                                     | 25. 85.1<br>27. 85.1<br>27. 64:1<br>27. 64:1<br>28. 4:1<br>28. 4:1<br>29. 9:1<br>20. 9:1<br>20  | 28.47:1<br>18.3:1<br>23:1<br>24.8:1   | 44 4:1<br>30:1<br>24:1<br>24:1<br>27:1<br>26:1<br>27:1<br>28:1<br>28:1<br>28:1<br>28:1<br>28:1<br>28:1<br>28:1<br>28  |
| 7.1<br>7.25:1<br>7.25:1<br>7.2:1<br>6.1<br>6.2:1<br>88.25:1<br>88.33:1                                   | 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Pr. Cent of Weight on Rear Wheels Fir Fir Gddy Fir Fir Fir Fir Fir Kim Equipment Wheels-Make ТОПТЭТОЕ Wheelbase Steering Gear Rear Tires 22447244 24447244 2444 Front Tires Springs 8:1 23.1.5 28.1.5 28.1.5 28.55 28.55 28.00 28.1.1 39.65 39.65 33.88 31.1.1 4:1 Total Gear Re-duction in Low 10101 28:1 31.2:1 31.2:1 31:1 20.15:1 23.25:1 30.4:1 Total Gear Re-duction in High 88:1 7.75:1 7.75:1 8.25:1 8.25:1 8.6:1 6.6:1 6.5:1 7.8:1 7.8:1 25:1 25:1 66:1 66:1 66:1 99:1 75:1 Rear Azle Final Drive Continued Universal Location of Transmission מת: תו מתשמתם: שששמתב: משמתששששתם: מתמשמתמתמתמתמתמת מתחבי מת: מתחבי מתחבי מתחבי מתחבי ಬಿಲ್ಲರುವೂ ಈ <sup>ಒ</sup>ಬಿಲುವಿ ಬಳೆದ ಬೆರುಬಲ್ಲಿ ಈ ಬರುಬಲ್ಲಿ ಕೆಲ್ಲಿ ಬೆಳೆ ಈ ಬರುಬಲ್ಲಿ ಈ ಬರುಬಲ್ಲಿ ಅವರ ಈ ಈ ಬರುಬಲ್ಲಿ ಈ ಈ ಬರುಬಲ್ಲಿ ಬರುವಿ Speeds Forward Clutch. 「日よんよりは日日とり」と「ひして又「ひし」として「しつ以上日日としり」「「「「」、 全〇〇日上上口に対する「 Engine Starter Berger Barren Berger Be Enition System Fuel Feed Carburetor Lubrication Radiator Type How Cooled OFCOCCEHHHHCOTOFFCCCC Valve Arrange't Horsepower Bore and Stroke Engine—4 Cyl, unless otherwise noted Chassis Price Ton-Continued Chassis Weight n Br's. Speed Truck 2 1-Bernstein 15. naaoo G maaoo G 18 1% -Springfield K31 -Springfield K32, Il General Utility. Dav'n't, I Model nt 10 B.
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| Governor                                   | Mon  |
| Wheelbase                                  | 1447   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1450   1550  |
| Steering Gear                              | Rose  |
| Rear Tires                                 | 34x6<br>36x6<br>36x6<br>36x6<br>36x6<br>36x6<br>36x7<br>36x7<br>36   |
| Front Tires                                | 3.4x4<br>3.4x4<br>3.4x4<br>3.4x4<br>3.4x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.6x4<br>3.   |
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| Owner Hard Hard Hard Hard Hard Hard Hard Har   | Full Full Cott Cott Cott Warn Select Warn Select Cott Cott Cott Cott Cott Cott Cott Co   | COORT  |
| DODDUTE CTETO THE CHECKES TO THE CHECKES FOR THE CORD  | よれた日本でも日本でしょり」   | あもでからませいかい でしい こうしゅ  |
|  |  |  |
| BCCC4CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC   | よれた日本でも日本でしょり」   | A  |
| Dec  | Bos Eis  | BESS CONTRACTOR OF THE PROPERTY OF THE PROPERT   |
| Mass   G   Eis   | F   Strm   G   Bos     F     B   Strm   G   Bos     F     F   Strm   G   Eis     D     F   Strm   G   Eis   G   F     F   Strm   G   Eis   Q   F     F   Strm   V   Bos   Q   F     F   Strm   V   Bos   W   C     F   Strm   V   Str   W   C     F   Strm   V   Eis   W   C     F   Strm   V   Eis   W   C     F   Strm   V   Eis   W   C     F   Strm   G   Bor   D     F   Strm   G  | Mar   V   Eis   E  |
| Mass G   Eis   | Strm   G   Bos   F   Stre   V   Els   Strm   G   Els   C   Els   Strm   C   Els   G   Els   Els   G   Els   Els   G   Els  | B   Mar   V   Eis   E     Rayi   V   Eis   E     Zen   G   Bes   E     Zen   G   Bes   E     Strm   G   Bes   E     Strm   G   Bes   E     Strm   G   Bes   E     Strm   G   Bes   G   E     F   Strm   G   Eis   E     F   Strm   E   Strm   E  |
| C   C   C   C   C   C   C   C   C   C  | P H  | P   Con   B   Rayf   V   Eis   E   |
| C   C   C   E   E  | L C Own F Sheb V Else F C Own F Sheb V Else F C T C T C T C T C T C T C T C T C T C  | Con   B   Mar   V   Eis   E  |
| C   C   C   C   C   C   C   C   C   C  | 445 25 32 4 L P H F Strm G Bos F F A 25 28 9 L C Own F Sheb V Elss F Sheb S 32 4 L C Own F Strm G Elss F S 32 4 L C Own F Strm G Elss F S 32 4 L C F W F Strm V Bos Q F F S 25 28 9 L C F W F Strm V Bos Q F F S 25 25 25 2 L C F F Strm P Dix B D D S 25 25 2 L C F F Strm P Dix B D D S 25 25 25 L C F F S 25 C C F C F S 25 C C C F S 25 C C C C C C C C C C C C C C C C C C   | 4455654 32.4 L C G G B Rayf V Eis B Rayf C G Eis Rayf C Eis B Rayf C G Eis B Rayf C Eis B Rayf C G Eis C G G B Rayf C G Eis C G G G B Rayf C G Eis G G B G G G G G G G G G G G G G G G G   |
| Buda 4444 5 28 9 1 C T B Mas G Ess Buda 4444 5 28 9 1 C T B Mas G Ess Buda 4444 5 28 9 1 C T B Mas G Ess Buda 4444 5 28 9 1 C T B Mas G Ess Buda 4444 5 28 9 1 C T B Mas G Ess Buda 444 5 28 9 1 C T B Mas G Ess Buda 444 5 28 9 1 C T B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T B B Mas G Ess Buda 444 5 28 9 1 C T F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G Ess Buda 444 5 28 9 1 C F F G B B Mas G G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 444 5 28 9 1 C F F G B G Ess Buda 44   | Cont 435 253 24 L P H F Strm G Bos F F Cont 435 25 24 L C Own F Sheb V Elss F F Else F   | Wau         444         V Cont         A Cont  |
| 2899 Buda 444254 28.9 L C T B Mas G Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 2259 Even 44425 28.9 L C T F S Strm G Eis W F E S S S S S S S S S S S S S S S S S S  | 10   10   14   14   15   15   15   15   15   15  | 4000 Wau 445x64 32.4 L P Can B Rayf V Eis B Rayf Cont 445x64 32.4 L C T F E Zen G Ber L L C T F Zen G Ber G Ber L L C T F Zen G Ber G  |
| 2890   Buda   44,255   28.9   L   C   T   B   Mas   G   Eis     31990   Buda   44,255   28.9   L   C   T   B   Mas   G   Eis     31990   Buda   44,255   28.9   L   C   T   B   Mas   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Eis     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Bos   G     3250   Cont   44,555   28.9   L   C   T   F   Strm   G   Bos   G     3250   Buda   44,555   28.9   L   C   T   F   Strm   G   Bos   G     3250   Buda   44,555   28.9   L   C   F   F   Strm   G   Bos   G     3250   Cont   44,555   28.9   L   C   F   F   F   Strm   G   Bos   G     3250   Cont   44,555   28.9   L   C   F   F   Strm   G   Bos   G     3250   Cont   44,555   28.9   L   C   F   F   F   Strm   G   Bos   G     3250   Cont   44,555   28.9   L   C   F   F   F   F   F   F     3250   Cont   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F     3250   Buda   44,555   28.9   L   C   F   F   F   F   F   F     3250   Buda   44,555   28.9   L   F   F   F   F   F   F   F     3250   Buda   44,555   28.9   L   F   F   F   F   F   F   F     3250   Buda   44,555   28.9   L   F   F   F   F   F   F   F   F     3250   Buda   44,555   28.9   L   F   F   F   F   F  | Cont 435 253 24 L P H F Strm G Bos F F Cont 435 25 24 L C Own F Sheb V Elss F F Else F   | Wau         444         V Cont         A Cont  |
| 2899 Buda 444254 28.9 L C T B Mas G Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 2259 Even 44425 28.9 L C T F S Strm G Eis W F E S S S S S S S S S S S S S S S S S S  | 10   10   14   14   15   15   15   15   15   15  | 4990 Wau 445x64 32.4 L P Can B Rayf V Eis B Rayf Cont 445x64 32.4 L C T F E Zen G Ber L L C T F Zen G Ber G Ber G Ber G Ber L L C T F Zen G Ber G  |
| 2899 Buda 444254 28.9 L C T B Mas G Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 3309 Buda 444254 28.9 L C T B Mas G Eis D Eis 2259 Even 44425 28.9 L C T F S Strm G Eis W F E S S S S S S S S S S S S S S S S S S  | Name   | 4000 Wau 445x64 32.4 L P Can B Rayf V Eis B Rayf Cont 445x64 32.4 L C T F E Zen G Ber L L C T F Zen G Ber G Ber L L C T F Zen G Ber G  |
| 4300   2299   Buda   445.654   28 9 1 L   C T   B   Mas   G   Eis   D     4400   2299   Buda   445.654   28 9 1 L   C T   B   Mas   G   Eis   D     4500   3290   Buda   445.654   28 9 1 L   C T   B   Mas   G   Eis   D     4500   3290   Buda   445.654   324 4 L   C   C Own   B   Mill   G   Eis   D     4500   3250   Buda   445.654   324 4 L   C   C Own   B   Mill   G   Eis   D     4500   3250   Buda   445.654   324 4 L   C   C T   T   B   Ram   G   Eis   D     4500   3250   Was   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4500   3250   Buda   445.654   327 2 L   C   T   T   F   Ram   G   Eis   D     4400   3250   Cont   445.654   327 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   327 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   327 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   C   Fed   B   Ram   G   Eis   D     4400   3250   Cont   445.654   329 2 L   C   C   Fed   B   Ram   G   Eis   D     4400   325   | 10   10   14   14   15   15   15   15   15   15  | 4000 Wau 445x64 32.4 L P Can B Rayf V Eis B Rayf Cont 445x64 32.4 L C T F E Zen G Ber L L C T F Zen G Ber G Ber L L C T F Zen G Ber G  |

Rim Equipment Pr. Cent of Welght on Rear Wheels

Wheels-Make

Steering Gear

вэліТ таэЯ

Front Tires

Total Gear Reduction in Low

Total Gear Redaction in High

Final Drive Rear Arle

Universal

Clutch

Transmission
Speeds Forward
Location of
The series of the

Ignition System Engine Starter

Bore and Stroke

Engine—4 Cyl. unless otherwise noted

Chassis Weight
Chassis Price

Model

Horsepower
Valve Arrange't
How Cooled
Radiator
Make or Type
Lubrication
Carburetor

Springs

|             | THE COMMERCIAL CAR TOWNS   |       |  |
|-------------|--|-------|--|
|             | THE COMMERCIAL CAR JOURNAL   |       | MAY 15, 1920   |
|             | Fir   74   88   89   89   89   89   89   89   8  |       | Fir   75   55   55   55   55   55   55   5   |
|             | Smi<br>Smi<br>Smi<br>Smi<br>Smi<br>Smi<br>Smi<br>Smi<br>Smi<br>Smi   |       | Sch<br>Smi<br>Cla<br>Smi<br>Smi<br>Smi   |
|             | 156   Phare   156   Phare   156   Phare   162   Simp   163   Phare   156   Phare   1   |       | 175   Pier   S   124   Pier   159   Dup   S   159   S   150   Dup   S   167   S   16   |
|             | Gem  |       | Ross Lav Gem Jac Gem Gem Lav Ross Ross Ross  |
|             | 36x5<br>40x5<br>40x5<br>40x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5<br>40x5 |       | 36x10†<br>  36x7<br>  40x10<br>  44x10<br>  40x10<br>  40x10<br>  40x10<br>  40x5<br>  40x5<br>  40x5<br>  80x6†   |
|             | 38375  |       | 36x5<br>36x7<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5<br>36x5   |
|             | Nather Na   |       | Per Elip<br>Mer Per USS Mer US   |
|             | 151.56.1<br>41.32.1<br>58.611<br>58.611<br>58.611<br>58.611<br>49.611<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.911<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>41.921<br>42.921<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>42.931<br>43.931<br>44.831<br>44.831<br>44.831<br>44.831<br>44.831<br>44.831<br>45.931<br>46.931<br>46.931<br>46.931<br>46.931<br>46.931<br>47.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.931<br>48.   |       | 49.5:1<br>1:1<br>42.35:1<br>5.35:1<br>32.3:1<br>42.35:1<br>37.71:1<br>46.1   |
|             | 10.33:1<br>  10.33:1<br>  10.25:1<br>  10.33:1<br>  10.3   |       | 10:1<br>9.6:1<br>10.5:1<br>10:1<br>10:1<br>10:7<br>10:7<br>10:7<br>10:1<br>10:33:1<br>7.8:1<br>10:1  |
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| n-Continued | B. B   |       | t A<br>d K45.  |
| 3½ Ton      | Rederal WD.  Gary KT.  Gary KT.  Gary KT.  G.M.C. 71B  G.M.C. 71B  G.M.C. 71B  Hall  Haln F.  Harvey WHA  Kally-Springfield K  Mack AC  Noble ETO  Reynolds TA  Sanford W  Sanford W  Sanford M  Sanford M  Sanford M  Mitch City 4 Wheel  United City 4 Wheel  United City 4 Wheel  United City 4 Wheel  United City 4 Wheel  Wilson G   | 4 Ton | Bessener K2. Double-Drive B. Gabriels Highway-Knight Jumb 40. Kally-Springfield Kindpall E. Moreland 20G. Peackard E. E. Riker 3B.   |

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| 36x6<br>36x6<br>36x6<br>36x6<br> 36x6  | 200 x 0<br>200 x | 38x6<br>38x6<br>38x6<br>38x6<br>38x6<br>38x6<br>38x6<br>38x6   |
| Shel<br>Row<br>Row<br>Math<br>Shel   | Net  | Det<br>Per<br>Per<br>Mer   |
| 12.75:1<br>42:1<br>72:1<br>72:1<br>49.2:1<br>54.84:1   | 53.3:1<br>56.4:1<br>56.4:1<br>56.4:1<br>62.6:1<br>62.6:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>68.19:1<br>69.19:1<br>69.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1<br>60.19:1   | 45.2:1<br>49.6:1:1   |
| 8.75:1<br>12:1<br>12:1<br>12:1<br>10.25:1  | 11.66:11<br>11.66:11<br>11.66:11<br>12.55:11<br>12.55:11<br>12.55:11<br>13.66:11<br>14:11<br>14:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16:11<br>16   | 10.6:1<br>11.4:1<br>112.39:<br>10.25:  |
| Thom<br>Thom<br>Thom<br>Torb<br>Shel   | Timk Kinnk K   | Dead<br>Timk<br>Dead<br>Dead<br>Timk<br>Flot   |
| 833348   | #####################################  | <u>0000≥≥≥</u>   |
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| Full Full B-Li   | BB-Line BB-Lin   | Selec<br>Covt<br>B-Li<br>Selec<br>Covt<br>B-Li<br>Selec<br>Own   |
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| 72777200<br>7200000  | ORGEREARING ARREST ARREST ARREST CONTROL OF ARRE   | 20日日日田日 .  |
| TO Leed TO THE T | COCCOCACOCACOCACCCCACCCCCCCCCCCCCCCCCC   | OCCOCO CONTROL   |
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| 6370   4350   7700   4500   7700   4500   7700   7700   7500   7700   7500   7500   7500   7500   7995   | 8850 1555 CQ 9500 15575 CQ 950   | 8500<br>7530<br>9350<br>9350<br>9550<br>8750<br>8750<br>8750<br>8750<br>8750<br>8750<br>8750<br>8  |
| 777 777 777 777 777 777 777 777 777 777 777 777 770 866  | 897678 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8   |  |
|  | B5.  WY Wich Mich Mich Mich Mich Mich Mich Mich M  | <b>d 7</b>   |
| DWS<br>DW.   | RSE. 120B. 120B. 120B. 120B. 120B. 13B. 13B. 13B. 13B. 13B. 13B. 13B. 13   | 6 and 7 1919. 1919. 1917. 1918. 1919 |
| Rowe HW. Schwarts DW. Schwarts DW. Union H.  | 6 Ton  Acason M  Acason M  Acason M  Available F5  Brookway F  Couple Gear AC  Deaby-Elder E  Deaby-Elder E  Deaby-Elder E  Garford 68  Hall Benstein 50  Kimball F  Kinball F  Kinball F  Kinball F  Kinball F  Kinball C  Kinball F  Kinball C  Kinball F  Kinball C  Kinball C  Kinball F  Kinball C  K  Kinb   | 51/2. 6 and Doane 1919. Hall Garford 69. Macear GI. Packard G. E. Royal 6.   |
|  |  |  |

1116 ------

| SIGNAL MOON TOO                               | 1  | THE COMMERCIAL   | CAI                 | R JOURNAL                      | MAY 15, 1  |
|---|--|--|---------------------|--------------------------------|--|
| Pr. Cent of Weight<br>on Rear Wheels          |  | 80 890 890 890   | 37                  | Cent of Weight<br>Rear Wheels  |  |
| Rim Equipment                                 | Gdy  | A Fire   |                     |                                |  |
| Wheels-Make                                   | Sch<br>Och<br>Seb<br>Smi<br>Smi  | Det Smi Smi Smi Own Day Wan Wan Wan Wan Sch  |                     | heelbase                       | W. 8898888888888888888888888888888888888   |
| Сочетног                                      | Own<br>Own<br>Wau<br>Wau<br>Wau<br>Dup   | Hink<br>Phar<br>Phar<br>Phar<br>Simp<br>Simp<br>Simp<br>Dup<br>Dup   | Pier                | 189D gaires                    | C 882 822 2  |
| Wheelbase                                     | 168<br>174<br>174<br>174<br>168<br>174<br>165  | 112<br>1165<br>1105<br>1105<br>1102<br>1152<br>1108<br>1138<br>1138<br>1199<br>1119  | 80                  |                                |  |
| Steering Gear                                 | Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross   | Own<br>Gem<br>Gem<br>Ges<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Ross<br>Gem<br>Gem<br>Gem<br>Gem<br>Gem<br>Gem<br>Gem  | Gem                 | estiT tas                      | 32x3<br>36x3<br>36x3<br>36x3<br>36x3<br>36x4<br>36x4<br>36x4<br>36   |
| вэліТ тазЯ                                    | 40x12<br>40x7<br>36x6<br>40x7<br>40x7<br>40x7<br>40x7<br>40x7<br>40x7<br>40x7  | 36x7<br>  36x54<br>  36x54<br>  36x54<br>  40x57<br>  40x57<br>  40x67<br>  36x44<br>  40x7<br>  40x64<br>  40x7<br>  40x7<br> | 36x5                |                                |  |
| Front Tires                                   | 36x6<br>36x7<br>36x7<br>36x7<br>36x7<br>36x7<br>36x6<br>36x6   | 36x4<br>36x4<br>36x5<br>36x5<br>36x6<br>36x6<br>36x6<br>36x6<br>36x4<br>36x4<br>36x4<br>36x4   | 34x4                | seriT Juor                     | E. S.  |
| Springs                                       | Kal   Mer   Math   Tut   Mer   Mer   Mer   She     She     Mer     | Per Math Math Per Per Per Per Det Math Math Math Mer Mer Mer Mer Mer Det Ber Mer Ber Ber Ber Ber Ber Ber Ber Ber Ber B   |                     | egairt                         | Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Trut<br>Trut<br>Trut<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel<br>Shel   |
| Total Gear Re-<br>wod ai noitoub              | 60.7:1<br>  33.7<br>  60.5:1<br>  37.16<br>  5.7:1<br>  43.6:1<br>  66.2:1   | 40.7:1<br>59.88:1<br>24:1<br>1:0145<br>1:0145<br>37:1<br>42.27<br>37:1<br>42.27<br>34.27<br>34.2<br>34.2<br>34.2<br>34.2<br>34.2<br>34.2<br>34.2<br>34.2   |                     |                                | :  |
| Total Gear Re-<br>duction in High             | 0.25:1<br>0.5:1<br>2:1<br>2:1<br>1.58<br>0.86:1<br>2:1   | 25:1<br>:1:1:1<br>:1:08<br>008<br>008<br>008<br>008<br>25:1<br>76<br>76<br>10  |                     | ear Azle                       | Shel Shel Flot Own Timk Shel Flot Own Shel Flot Cown Shel Timk Shel Timk Shel Timk Own Own Own Own Own Own Timk Shel Timk Own Timk Shel  |
| Rear Azle                                     | D G AL   | Russ   9   1   1   1   1   1   1   1   1   1   | ımk                 | evirC                          |  |
| Final Drive                                   | E BOLMOOMBO : 3  |  |                     | рамточ sbeeds                  |  |
| LastevinU                                     | Cont<br>Spic<br>Spic<br>Spic<br>Spic<br>Spic<br>Spic<br>Spic<br>Spic   | Spic Spic Spic Spic Spic Spic Spic Spic  |                     |                                | 1  |
| Speeds Forward<br>Location of<br>Transmission | On 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 444444 3000044 4000004444444 300000444 400000000   | erc                 | Controller                     | Own Own Own Own Own OG-Bet OG- |
| noissimenaT                                   |  | Cott Own Own Selec   | mo                  |                                |  |
| Engine Starter<br>Clutch                      | OK LAO BOD   | DECOCOPED THE PRESE  | ectric (            | 1030M                          | #####################################  |
| Lgnition System                               |  | 2 9 2 7 2 9 2 2 2 2 2 2 2 2 2 2 2 2 2 2  |                     |                                | . : : : : .  |
| Fuel Feed                                     | Olympia Company Compan | Bos<br>Eiss Spl<br>Eiss Bos<br>Masg Masg<br>Masg Masg Masg<br>Masg Masg Masg<br>Masg Masg Masg Masg Masg Masg Masg Masg  | ត                   | Mileage Per<br>Charge          | 800 447<br>800 800 800 800 800 800 800 800 800 800   |
| Carburetor                                    |  | Site   Color   |                     |                                |  |
| Lubrication                                   |  | B Separate S   |                     | Battery                        | Property of the control of the contr |
| Radiator<br>Make or Tyr                       |  | TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT   |                     |                                |  |
| Valve Arranged                                | 0000000000   | 40000000000000: 000000   |                     | Maximum Speed                  | 211221144412221122211001100000000000000  |
| Ногзеромет                                    | 0 4 4 4 6 C 4 4 A C  | 22.28  |                     | Chassia Price                  | 2300<br>2700<br>3900<br>4400   |
| Bore and Stro                                 | 4 49 49 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  | 44440040040040040000000000000000000000   |                     | 4                              |  |
| Engine—4 C. noted noted                       | oont wwn was an and and and and and and and and and  | Cont   Co   | LS                  | Chassis Weight                 | 1400<br>2300<br>2770<br>2770<br>2770<br>2770<br>2770<br>3430<br>3500<br>4500<br>6500<br>6500<br>6500<br>6500<br>10000<br>10000<br>6500<br>65   |
|   | 8 2 88: 88:008 28  | 4700 3050 Cont<br>6800 4025 Cont<br>7760 Wis<br>8450 Wis<br>4000 1425 Own<br>4450 3095 Buda<br>8500 0000 Own<br>1450 3450 Her<br>8500 0000 Own<br>14750 3450 Her<br>8000 Wis<br>8000 Wis<br>8272 5750 Own<br>8225 6500 Own<br>8225 6500 Own<br>8225 6500 Own<br>8225 5750 Own<br>8225 5750 Own<br>8650 6000 Own  | ial Cars            | Carrying<br>Capacity           | 756<br>1000<br>1000<br>1200<br>1200<br>1200<br>1200<br>1000<br>100   |
| Model Model                                   |  | Federal Light Duty   A   | Electric Commercial | R. C. M. Name and Model Number | Carlys Ward WS Walker M Alantio IC Ward WA Ward WE Carl I Ward WE Carl I Ward WE Ward WE Carl I Ward WE Carl I Ward WE Carl I Ward WE Ward WE Ward WE Ward WE Ward WE Carl I Ward WE Ward WE Ward WE Ward WE Ward WE Ward WE Carl I Ward WE Ward WE Ward WE Carl I Ward WH WH WARD WH WH WARD WH WH WARD WH WH WH WARD WH WH WH WH WARD WH W   |

### Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motor Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin-Parry Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye-Beck-Hawkeye Motor Truck Works, Cedar Rapids.

Iowa.

Bell—Iowa Motor Truck Co., Ottumwa, Ia.

Bellmont—Belmont Motors Corp., Lewistown, Pa.

Bessemer—Bessemer Motor Truck Co., Grove City, Pa.

Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.

Betz—Betz Motor Truck Co., Hammond, Ind.

Birch—Birch Motor Cars, Chicago, Ill.

Brinton—Brinton Motor Truck Co., Philadelphia, Pa.

Brockway—Brockway Motor Truck Co., Cortland, N. Y.

Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Capitol—Capitol Motors Corp, Fall River, Mass.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck Inc., Chicago, Ill.
Clydesdale—Clydesdale Motor Truck Co., Clyde, Ohio.
Coller—Collier Motor Truck Co., Bellevue, Ohio.
Coller—Collier Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.
Datt—Datt Truck & Tractor Carp. Waterloo, In

Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids,
Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Defiance Motor Truck Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Dependable—Dependable Truck & Tractor Co., Galesburg, Ill.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Double Drive—Double Drive Truck Co., Chicago, Ill.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex Truck Co., Lansing, Mich.
Eagle—Eagle Motor Truck Corp., St. Louis, Mo.

Eagle—Eagle Motor Truck Corp., St. Louis, Mo. Ellsworth—Mills-Ellsworth Co., Keokuk, Ia. Elmira—Elmira Commercial Motor Car Co., Inc., Owego, N. Y. Erle—Erle Motor Truck Mfg. Co., Erle, Pa.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis. Fageol—Fageol Motors Co., Oakland, Cal. Famous—Famous Trucks, Inc., St. Joseph, Mich. Fargo—Fargo Motor Truck Co., Chicago, Ill. Federal—Federal Motor Truck Co., Detroit, Mich. Ford—Ford Motor Co., Highland Park, Mich. Forschier—Forschier Motor Truck Mfg. Co., New Orleans, La. Front Drive—Double Drive Truck Co., Chicago, Ill. Fulton—Fulton Motors Corp., New York, N. Y.

G. M. C.—General Motors Corp., New York, N. I.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Gabriel—Gabriel Motor Truck Co., Cleveland, Ohio.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Glant—Giant Truck Corp., Chicago Heights, Ill.
Graham—Graham Brothers, Evansville, Ind.
Gramm—Bernstein—Gramm—Bernstein Motor Truck Co., Lima, Oh
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Grant—Grant Motor Car Corp., Truck Division, Cleveland Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa. Hall—Lewis-Hall Motors Corp., Detroit, Mich. Harvey—Harvey Motor Truck Co., Detroit, Mich. Hawkeye—Hawkeye Truck Co., Sioux City, Ia. Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill. Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal. Highway-Knight—Highway Motors Co., Chicago, Ill. Higrade—Higrade Motors Co., Harbor Springs, Mich. H & M—H & M Motor Truck Co., Inc., Baltimore, Md. Hood—Hood Mfg. Co., Seattle, Wash. Hoover—Hoover Wagon Co., York, Pa. H. R. L.—H. R. L. Motor Co., Seattle, Wash. Huffman—Huffman Bros. Co., Elkhart, Ind. Hurlburt—Hurlburt Motors, Inc., New York, N. Y. Independent—Independent Motor Co., Youngstown, O.

Independent—Independent Motor Co., Youngstown, O. Independent—Independent Motor Truck Co., Inc., Davenport, Ia. Indiana—Indiana Truck Corp., Marion, Ind. International—International Harvester Co., Chicago, Ill.

Jackson—Jackson Motors Corp., Jackson, Mich. Jones—Jones Motor Car Co., Wichita, Kans. Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Karavan—Caravan Motors Co., Portland, Ore.
Kearns-Kearns-Dughie Motors Co., Beavertown, Pa.
Keidon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield,
Ohio.

Ohio.

Keystone—Keystone Motor Truck Corp., Philadelphia, Pa.

Kimball—Kimball Motor Truck Co., Los Angeles, Cal.

King Zeitler—King Zeitler Co., Chicago, Ill.

Kissel—Kissel Motor Car Co., Hartford, Wis.

Kleiber—Kleiber & Co., Inc., San Francisco, Cal.

Knox—Knox Motors Co., Springfield, Mass.

Koehler—H. J. Koehler Motors Corp., Newark, N. J.

Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Minn.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Marshall—Marshall Mfg. Co., Chicago, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Mutual—Mutual Truck Co., Sullivan, Ind.

Napoleon—Napoleon Motors Co., Traverse City, Mich. Nash—Nash Motors Co., Kenosha, Wis. Nelson-LeMoon—Nelson & LeMoon, Chicago, Ill. Netco—New England Truck Co., Fitchburg, Mass. Niles—Niles Motor Truck Co., Pittsburgh, Pa. Noble—Noble Motor Truck Co., Kendallville, Ind. Northway—Northway Motors Co., Natick, Mass. Northwestern—Starr Carriage Co., Seattle, Wash. Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla. Ogden—Ogden Motor & Supply Co., Chicago, Ill. Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky. Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill. Oldsmobile—Olds Motor Works, Lansing, Mich. Oneida—Oneida Motor Truck Co., Green Bay, Wis. Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.

Packard—Packard Motor Car Co., Detroit, Mich.
Palge—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Patriot Motors Co., Lincoln, Neb.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Pioneer—Pioneer Truck Co., Chicago, Ill.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y. Reliance—Reliance Motor Truck Co., Appleton, Wis. Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa. Rec—Reo Motor Car Co., Lansing, Mich. Republic—Republic Motor Truck Co., Inc., Alma, Mich. Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich. Riker—Locomobile Co. of America, Bridgeport, Conn. Rowe—Rowe Motor Mfg. Co., Lancaster, Pa. Royal—Royal Motor Truck of N. Y., New York, N. Y.

Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Cincinnati, O.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester. N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Southern—Southern Truck & Car Corp., Greenboro, N. C.
Spacke—Spacke Machine & Tool Co., Indianapolis, Ind.
Standard—Standard Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Texas.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich.
Traylor—Traylor Eng. & Mfg. Co., Cornwells, Pa.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City F. W. D.—Twin City Four Wheel Drive Co., Inc., St.
Paul, Minn.
Twin City—Minneapolis Steel & Mach. Co., Minneapolis, Minn.

Ultimate—Vreeland Motor Co., Inc., Newark, N. J.
Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill. Victor—Victor Motor Truck & Trailer Co., Chicago, Ill. Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walker-Johnson—Walker-Johnson Truck Co., Woburn, Mass.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y.
Wells—Evans Truck & Axle Co., Auburn, Ind.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Motor Corp., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

### Price List, Maximum Capacities and Inflation Pressures of Large Size Pneumatic Tire Casings

|                                     | 36 x 6  |  | 1                                     | 38 x 7   |        |  | 40 x 8   |  | -   | 42 x 9   |  |  | 14 = 10  | 130 0 |
|-------------------------------------|---|--|---------------------------------------|--|--------|--|--|--|---|--|--|--|--|---|
| ice                                 | arrying   | fation   | ioe                                   | urrying<br>upacity                                   | fation | ice  | rrying   | fation   | 90  | urrying  | fation   | 8  | pacity   | Tation  |
| Pr                                  | <b>ರಿ</b> ರ   | EE.  | Pr                                    | ÜÜ   | 교전     | Pr   | 22   | FF   | P.  | ರೆರ  | FF   | Pa   | <b>లే</b> లే   | E   |
| 23.85                               | 2000  | 106  |                                       |  |        |  |  |  |   |  |  |  |  |   |
|                                     | 77  |  | 166.00                                |  |        | 912 25   |  |  |   |  |  | ******   |  |   |
|                                     |   |  |                                       |  |        |  |  |  |   |  | ***  |  | ****   | **  |
| 2.00<br>J.                          | 2000  | 90   | 184.55                                | 2700   | 100    | 239.10   | 3650   | 110  |   |  |  | *****  | ****   |   |
| 32.50                               |   |  | 187.35                                |  |        | 241.40   |  |  |   |  |  |  |  |   |
| 98.50                               |   | 95   | 139.25                                |  | 105    | 179.50   |  | 115  |   |  |  |  |  |   |
| 19.35                               | 2200  | 90   |                                       |  |        |  |  |  |   |  |  |  |  |   |
|                                     |   |  | 160 00                                | 9700   | 100    | 917 AE   | 2650   | 110  |   |  |  |  |  | • •   |
| .5.00                               |   | -  |                                       |  |        |  |  | 110  |   |  |  |  | ****   | **  |
| 12.00                               | 2200  | 90   | 180.00                                | 3000   | 100    | 230.00   | 4000   | 110  |   |  |  |  | ****   |   |
| 19.35                               | 2300  | 90   | 168.80                                | 3000   | 100    | 217.45   | 4000   | 110  |   |  |  |  |  |   |
| 19.35                               | 2200  | 90   | 168.80                                | 3000   | 100    | 217.45   | 4000   | 110  | 272.35  | 5000   | 120  | 380.65   | 6000   | 15  |
|                                     |   | 90   |                                       |  | 100    | 917.45   |  | 110  |   |  |  |  |  |   |
|                                     |   |  |                                       |  |        |  |  |  |   |  |  |  |  | 74  |
|                                     | 2200  | 90   | 185.15                                | 3000   | 100    | 238.50   | 4000   | 110  | 298.65  | 5000   | 120  | 417.45   | 6000   | 12  |
| 19.35                               | 2200  | 90   | 168.80                                | 3000   | 100    | 217.45   | 4000   | 110  |   |  |  | *****  |  |   |
| 19.35                               | 2200  | 90   | 168.80                                | 3000   | 100    | 217.45   | 4000   |  |   | ****   | * * *  | *****  | ****   |   |
| 19.35                               | 2000  | 90   | 168.80                                | 2700   | 100    | 217.45   | 3650   | 110  | 272 35  | 4650   | 120  | 290 65   | 5000   | i   |
|                                     |   |  | 100.00                                | 2100   | 100    | 211.10   | 9000   | 110  | 212.00  | 1000   | 120  | 300.00   | 0000   | 1   |
| 32.60                               | 2850  | 100  | 187.50                                |  |        |  | ****   | ***  | * * * * * *   |  | ***  |  |  |   |
| 09.80                               | 2000  | 90   |                                       |  |        |  |  |  |   |  |  |  |  |   |
| 08.30                               |   |  |                                       |  |        |  |  |  |   |  |  |  |  |   |
| nd. 1                               | nd.<br>2000   | 90   | 168.80                                | 2700   | 100    |  |  |  |   |  |  |  |  |   |
|                                     | 2000  |  |                                       | 2100   | 200    |  |  |  |   |  |  |  |  |   |
| 40.00<br>40.00                      |   |  | 188.00<br>188.00                      |  |        | 236.00   |  |  | * * * * * 4   |  |  |  |  |   |
|                                     |   |  |                                       |  |        |  |  |  |   |  |  |  |  |   |
| 31.25                               |   |  |                                       |  |        |  | ****   |  |   |  |  |  |  |   |
| ).                                  | 2200  | 100  |                                       |  |        |  |  |  |   |  |  |  |  |   |
| 10.05                               |   |  | 150.10                                | 2000   | 100    | 010 40   | 9750   | 100  |   |  |  |  |  |   |
| 19.35                               |   | 90   | 156.10                                | 3000   | 100    | 216.40   | 3750   | 100  |   |  |  | *****  | ****   |   |
| 26.65                               | 2200  | 90   | 177.65                                | 3000   | 100    | 228.90   | 4000   | 110  |   |  |  |  |  |   |
| 36.00                               | 2200  | 90   | ******                                | 3000   | 100    | 240.00   | 4000   | 110  |   |  |  |  |  |   |
| 25.20                               | 2000  | 90   |                                       |  |        |  |  | *** *  |   |  |  |  |  |   |
| 05 20                               |   | 0.0  | 177.05                                | 2000   | 100    | 000 00   | 3705   | 100  |   |  |  |  |  |   |
|                                     |   | 30   | 111.20                                | 3000   | 100    | 448.00   | 0120   | 100  |   |  | ***  |  |  |   |
| 08.40                               | 2200  | 90   | 153.35                                | 3000   | 100    | 197.60   | 4000   | 110  | *****   |  |  | * * * * * *  | * * * *  |   |
| 19.35                               | 2000  | 90   | 168.80                                | 2700   | 100    | 217.40   | 3650   | 110  |   |  |  |  |  |   |
| 32.00                               |   |  | 176.00                                |  |        |  |  |  |   |  |  |  |  |   |
|                                     | 2200  | 90   | 166 65                                | 3000   | 100    | 214 75   | 4000   | 110  |   |  |  |  |  |   |
| 21.00                               |   |  |                                       |  |        |  |  |  |   |  |  | *****  |  |   |
| 29.00                               | 2200  | 90   | 182.45                                | 3000   | 100    | 235.05   | 4000   | 110  |   |  | ***  |  |  |   |
| 44 00                               | 2200  | 90   | 192.00                                | 3000   | 100    | 240.00   | 4000   | 110  |   |  |  |  |  |   |
| 44.00                               | 2200  |  |                                       |  |        |  |  |  |   |  |  |  |  |   |
| 19.35                               | 2000  | 90   |                                       |  |        |  |  | *1* *  |   |  |  |  |  |   |
| 1 1 3 1 1 1 3 0 0 0 1 4 4 3 3 0 2 1 | 23.85<br>7.75<br>12.00<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>19.35<br>1 | 8.385 2000 17.75 12.00 2000 17.75 12.50 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2200 19.35 2000 | 10   10   10   10   10   10   10   10 | \$\begin{array}{cccccccccccccccccccccccccccccccccccc | State  | Section   Sect | \$\begin{align*}{c c c c c c c c c c c c c c c c c c c | Section   Sect | 1.00   200   90   168.80   2700   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   3000   100   217.45   4000   110   19.35   2200   90   168.80   2700   100   217.45   3650   110   19.35   2000   90   168.80   2700   100   217.45   3650   110   19.35   2000   90   168.80   2700   100   217.45   3650   110   19.35   2000   90   168.80   2700   100   217.45   3650   110   19.35   2000   90   168.80   2700   100   217.45   3650   110   31.25 | Section   Sect | Section   Sect | Section   Sect | Section   Sect | Section   Sect  |

### Individual vs. State in Muddy Road Controversy

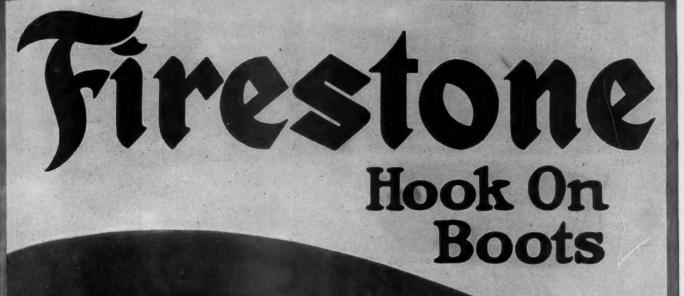
Truck owners of Illinois are interested in an unusual case in Macon County. A truck owned by Byrd Davis, of Decatur, became stalled in the muddy road near Elwin. Davis was unable to remove it and abandoned it. Its location was such that the progress of other vehicles was prevented and complaints were heard. After the truck remained in the road a week, the sheriff ordered Davis to remove it. He declined and was arrested and incarcerated in jail. He at first refused to give bond but after experiencing the inside of the county jail, relented and gave bond. He proposes to fight the case to the highest court and will maintain that if the township permits such impassable roads it is the duty of the township to remove vehicles if they become stalled. Both sides have lawyers and the trial of Davis will be hard fought.

The Law of Automobiles, by Xenophon P. Huddy, LL.B., of the New York Bar; Fifth edition by Arthur F. Curtis, of the Delhi, N. Y., Bar, Albany, N. Y., Matthew Bender & Co., Inc., 1919. This sterling work has thirty-three chapters, a voluminous and alphabetical table of cases cited, and a good index. There are 1279 pages, on thin, strong paper, making a compact but not unwieldly volume. The preface of this fifth edition appropriately states that "a lawyer would have passed

the recognized bounds of ordinary common sense had he predicted in 1906 the mass of judicial authority now to be found in the law reports." The major part of the book has been rearranged and rewritten therefore. Questions such as the liability of the owner for the acts of his chauffeur have assumed such importance that an entire chapter is devoted to their treatment.

Two Reo Speedwagons, each carrying a ton of steel frame members, recently made a trip from Milwaukee, Wis., to the Reo plant at Lansing, Mich., via Chicago, a distance of 350 miles, in the face of a raging snow storm in the elapsed time of 23 hours. Including stops made by the drivers for rest, meals, etc., an average rate of 15 miles an hour was maintained.

rirestone



Points of superiority are easy to find on the various types of Firestone Hook On Boots. Strength without weight or clumsiness has been obtained. Note the thick tread, beveled at the ends. See how steel hooks are riveted every two inches through a quarter-inch reinforcing of laminated rubber fabric. Built to give long service and stand the necessary road "punishment."

Firestone Tire Accessories have the unfailing dependability that has made Firestone Tires and Tubes known everywhere for long mileage. Every dealer who realizes the value of giving his customers most-miles-per-dollar accessory value appreciates this.

Order direct or through your jobber.

FIRESTONE TIRE & RUBBER COMPANY
Firestone Park, Akron, Ohio
Branches and Dealers Everywhere

### Fay Motor Bus Line

(Continued from page 24)

succeeding week, and his part of the earnings will increase proportionately. The drivers now average from \$30 to \$50 per week, and this good pay has attracted a very good class of men to the positions. At the present time about 75 per cent of the men are what may be called "old timers" with the company, and this percentage is constantly rising, showing that the company is gradually securing, through its fair methods, a loyal, settled class of employees who will work for its, and their, best interests.

The drivers are furnished with defect cards, on which they may check defects on their cars, to be repaired when the cars come in. Before repairs are made the shop foreman checks over the drivers' suggestions, to see whether the ills are the fault of the man driving the car. If they are, he is told how to avoid this trouble, and if it happens again he is very likely slated for discharge.

The Fay Compaany maintains a fine repair shop and roomy garage near the center of the city, where all repair work is done. A waiting room is also maintained here, and every bus on all the lines makes this the inbound terminal of each trip, checking in and out each time.

All repairs are made on order of the shop foreman, and every repair part is issued only on requisition.

### History of Tires Kept.

The company's method of handling tire records is excellent. The moment a new bus is delivered, the number of each tire is placed on a separate tire record card, on which is placed also the name of the maker, whom purchased from, etc. Below are columns for further records as the tire is used, so that when a tire is finally scrapped this original card, which has followed it through all its vicissitudes,

| THE FAY MOTO                              | RBU        | COMPANY  |
|---|------------|--|
| DEFE                                      | CT CARD    |  |
|   |            |  |
| Car NoRun No                              | Date       | 10   |
| Apparatus Indic                           |            | is defective                                     |
| X I                                       | X          |  |
| Brake: adjust service                     |            | Tire: cut  |
| Brake: adjust emergency Lights: headlight |            | Tire: mood rim lugs                              |
| Lights: headlight                         |            | Body: loses                                      |
| Lights: tail                              | V          | Body: window broken<br>Body: fender—bent, broken |
| Lights: dome                              |            | Body: springs                                    |
| Lights: switch                            |            | Body: axio-front, rear                           |
| Lights: headlight lenses                  |            | Steering wheel: needs adjusting                  |
| Lights: wiring                            |            | Speedemeter: not working                         |
| Clutch: olipping                          |            | Misc. Pladiator: leaking                         |
|   | -          | No crank   |
| Clatch: grabbing                          | 11 (80.00) | No tire rim wrench                               |
| Engine valves                             |            | He jack  |
| Engine: heating                           |            | Oll and grease:                                  |
| Engine: no power Engine: carbureter       | ** ****    | Front spring                                     |
| Engine: carbureter                        |            | Rear opping<br>Transmission                      |
| Engine: coley                             |            | Rear axia  |
| Engine: carbon deposit                    |            | Differential                                     |
| Tires: no spare tire                      |            | Universal joints—front, rear                     |
| . Tires: flat spare tire                  |            | Tersion red                                      |
|   |            |  |
| Remarks                                   |            |  |
|   |            |  |
|   |            |  |
|   |            |  |
|   |            |  |
|   |            |  |
| ReservedA. M., P. M.                      |            |  |
|   |            |  |
|   | -          | - Orlve  |
| Repaired. Date.                           |            |  |
|   |            |  |

Defective Parts Are Checked by Driver

has the complete mileage record, a record of the causes of its various troubles and repairs, in fact a life history of the tire.

When a tire develops trouble it is immediately taken from the bus and another tire goes out of the stock room in its place. This does not mean a new tire, it may be one that has been in for repairs. In this way no delays are incurred because of necessary tire repairs. And the card record kept of each shows always the mileage and wear record.

The driver is furnished with a complete accident report blank, so that in case of accident he may get the data necessary right at the time. This has proved an important feature.

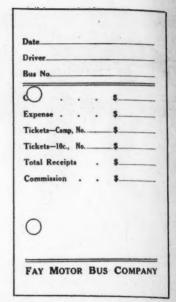
The buses are dispatched from the downtown office by an official called the chief dispatcher, who registers them in and out much as a railroad train is marked up. At the far end of the trip a checker registers each bus in and out, together with the number of passengers carried. Spotters are also used to keep track of the work the drivers are doing.

On a large sheet a daily bus receipts report is kept, showing each driver's name, the mileage made, the number of

trips, receipts, his commission and of other items record which is This, necessary. large filed in a loose-leaf binder. gives daily records from which constant comparisons may be made to the betterment of the business.

A smaller sheet is used for a daily cash receipts and disbursements report, which covers every item which into the enters financial end of the business. Mr. Fay knows each day right where he stands financially, and who will say that this is not one of the big reasons why he has been so successful? He does not "guess" anything about his business: he knows. And therein may lie the key to the whole matter of making a motor bus line successful.

In managing and developing his bus lines Mr. Fay has had the assistance of his son, W. W.



Total Receipts Envelope

Fay, who is quite as enthusiastic and energetic in extending their usefulness as is his father. Their big aim has been to make the motor buses so useful and convenient to Rockford people that patronage would be bound to develop, and they have succeeded admirably.

| CAS                                    | DA<br>H RECEIPTS A | ILY<br>ND DISBURSE | MENTS |
|--|--------------------|--------------------|-------|
| Cash Balance                           | 19                 | _                  | 10    |
| RECEIPTS                               | Amount             | War Tax            |       |
| From Agents                            |                    |                    |       |
| From Drivers                           |                    |                    |       |
| From Individuals and Companies         | - 1                |                    |       |
| From dividend and Interest             |                    |                    |       |
| rom Freight                            |                    |                    |       |
| From express                           |                    |                    |       |
|  |                    | Total              | d \$  |
| DISBURSEMENTS                          |                    |                    |       |
| 1. Pay-rolls                           |                    |                    | 1     |
| 2. Operating expenses                  |                    |                    |       |
| 3. Improvement Authorizations          |                    |                    |       |
| 4. Gasoline                            |                    |                    |       |
| Oil                                    |                    |                    |       |
| 6. Other Materials and Supplies        |                    |                    |       |
| 7. Taxes                               |                    |                    |       |
| 8. Freight Bills                       |                    |                    |       |
| 9. Express Bills                       |                    |                    |       |
| 10. Casualty and Insurance Reserver    |                    |                    |       |
| 11. Interest and Rentals               |                    |                    | 1 - 0 |
| 12. Miscellaneous                      |                    |                    |       |
| 13.                                    |                    |                    |       |
| Cash Balance                           | 19                 | Tel                | al \$ |
| Amount of Unpaid Vouchers in Tressurer |                    | -                  |       |

Daily Cash Receipts and Disbursements Report Sheet

# ROSS STEERING GEARS

# The Choice of 171 Motor Truck Engineering Departments

With a thorough knowledge of the importance of the steering gear in relation to efficient motor truck operation, the engineering departments of 171 different motor truck manufacturing plants, after a careful study of materials and workmanship, together with exhaustive tests and comparisons, have adopted Ross Steering Gears.

Each one of these 171 manufacturers use Ross Steering Gears as standard equipment on from one to nine different models. It is a significant fact that nearly two-thirds of all the motor trucks built in America are equipped with Ross Steering Gears.

As a manufacturer of motor trucks,

or as a business man considering the purchase of a motor truck, you owe it to yourself to investigate Ross Steering Gears, to find out why they guarantee easier steering, greater safety and reliability—why they predominate so overwhelmingly on motor trucks.

Write for catalog and any further information desired

ROSS GEAR & TOOL COMPANY

760 Heath Street, Lafayette, Indiana, U.S.A.

The Steering Gears that Predominate on Motor Trucks

They are already projecting lines elsewhere, notably a passenger and freight route covering a big loop to the southward of Rockford, taking in Byron, Leaf River, Mt. Morris, Oregon, Davis Junction and Stillman Valley, and residents along this line are eager for the inauguration of the service.

As pioneers in showing successful operation of motor buses in medium-sized cities, the Fays must be acounted among the first, for they are showing that lines may be run at a profit where many other like ventures, run on less business-like principles, have not proved successful, through no fault of the fundamental idea of motor transportation.

## Trailers Double Motor Truck Efficiency

(Continued from page 22)

trailers. Drop-frame trailers with sidedump bodies have recently been added to the list of models by several leading makers.

Any desired type of body can be mounted on trailer chassis, just as with motor truck chassis. Among these in use may be mentioned refrigerator bodies, hearse bodies, fire equipment, cattle racks, wood and steel dump bodies, tank bodies for oil and water, and omnibus bodies seating from 20 to 100 passengers.

#### Four Types of Trailers

Trailers built for use in connection with passenger cars and motor trucks may be divided into four general classifications: Two-wheel trailers; semi-trailers; four-wheel trailers, and pole and pipe trailers.

Two-wheel trailers are usually light vehicles intended for use behind passenger cars. Their load capacity ranges from 500 to 3000 lb. and they are used for the most part by camping tourists, by retail merchants for delivery work and by small farmers for work around the place and for trips to town.

Some makers are now producing trailers of the two-wheel type in 2 to 5 tons capacity for use behind motor trucks. Models for hauling lumber are made with hinged tongues which make it possible to dump the entire load at the rear by releasing the tongue lock and backing the truck slightly.

#### Semi-Trailers Are Larger

Although semi-trailer are made in all sizes from 1 to 15 tons capacity, the larger sizes predominate. In this form there are also but two wheels on the trailer but they are located under the rear end and the front end is supported on the rear part of the towing machine. The semi-trailer was developed originally by motor truck engineers and vehicles of this type are manufactured mostly by companies concentrating on the production of trailers.

In use, the rear of the passenger car body, or the entire load-carrying body of the motor truck, as the case may be, is removed and the lower part of a fifth wheel is mounted on the platform thus provided. The upper part is secured to the under-side of the front end of the semi-trailer and on connecting them the outfit becomes a six-wheel unit capable of carrying two to three times as much as the hauling vehicle alone could transport. The degree of increase in load depends to a large extent on the character of the roads over which the vehicles travel. Highest efficiency is obtained where the

roads have hard, dry surfaces such as asphalt, well-packed dirt or gravel. This doubling or tripling of load capacity makes the use of a semi-trailer very economical. For example, with a semi-trailer attached, a one-ton truck becomes a two to three-ton transportation unit, the cost of operation being increased but very slightly, due to the somewhat larger consumption of fuel and oil and to the increase to a certain extent in tire wear.

#### How Fifth Wheel Operates

It is the fifth wheel that makes the semi-trailer practical. This is very much like the fifth wheel used in wagon construction and operates in much the same way, allowing the towing vehicle to turn under the front end of the trailer just as the front axle and wheels of a wagon are free to turn under the forward end of the body. But the fifth wheel used in semi-trailers has an additional advantage in that one of the rings is mounted on a transfer shaft journaled either on the truck or trailer so that it will rock back and forward, permitting of tipping sideways as well as backward and forward, is a feature of the construction of a number of makes. Stiff coil springs are ordinarily provided to take up the shock of starting the trailer and its loads and to absorb the road stresses set up in action. The ease with which some semi-trailer fifth wheels can be uncoupled is a marked advantage in saving time in unloading. Sometimes a strong kingpin and locking device are used and in other instances a ball and socket connection is employed.

#### Four-Wheel Trailers

Operating requirements of the four-wheel trailers are somewhat different from those of the other types as they must be steerable, must track with the towing vehicle, must not wobble or side-sway, must be adapted to being backed readily into any position and must be connected to the towing vehicle by a spring drawbar that can be coupled and uncoupled instantly. At a result of these conditions the four-wheel trailers embody more engineering features than other types of trailer. The general range of four-wheel trailers is from 1200 lb to 10 tons load capacity.

#### Motor Truck Design Followed

Some four-wheel trailers are similar to horse-drawn trucks, having rigid front axles, which axles and wheels, turn as a unit on a fifth wheel. Most of the manufacturers, however, have followed the motor truck design incorporating steering knuckle axles, the tie-rod being linked with the drawbar so that the front wheels steer by the change of direction of the drawbar. For the purpose of coupling a number of trailers together in a train the drawbar is usually arranged with a large slot connection permitting sidewise movement of the drawbar but preventing vertical movement. It has a bumper head like that on a freight car and strong compression springs are generally provided to take up shocks and stresses.

Four-wheel trailers are made in both reversible and non-reversible types, the reversible trailer having steering-knuckle axles and the same drawbar and steering connection mechanism at each end. Automobile parts are used for the manufacture of most of the lighter four-wheel trailers but for the heavier types motor truck parts are employed because of their greater strength and load capacity.

The towing vehicle carries its own load when a four-wheel trailer is used; the trailer load sufficing to at least double the capacity of the towing vehicle alone. These trailers weigh from one-half their greatest carrying capacity and reduce ton-mile cost of haulage from 20 to 33 per cent.



Outfit of David Lupton's Sons Company, Philadelphia, Pa.

This company operates a three-ton Troy trailer behind their White truck. Illustration showing up-take for 7500 D. W. tons cargo for vessel. Manufactured for the Emergency Fleet Corporation

SIVYER S CASTINGS

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Sivyer Steel Rear Axle Housing used on worm drive trucks



Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merits in resisting crystallization. It also depends but little on the inherent scientific accuracy of the casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is heat and metal. is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

TO keep unsprung weight at a minimum, rear axle housings are designed with thin metal sections. Because of the continual shocks. heavy jolts and vibrational stresses to which these housings are normally subjected in truck service, they must be free from strains and proof against crystallization and failure. Many castings made by ordinary methods have a tendency to draw and crack in cooling, due to the difficulty in getting the metal to run uniformly in the thin sections. Devised by Sivver, special methods of heading, gating and of mixing and molding the core sand overcame this difficulty. Moreover, the thorough Sivver heat-treatment, the notable strength and crystallization-resisting properties of Sivyer Electric Steel provide castings certain to be unaffected during the life of the truck. Such metal merits as these have won for Sivyer Castings their national market.

SIVYER STEEL CASTING COMPANY, MILWAUKEE

#### Pole and Pipe Trailers

There is some similarity between pole trailers and semi-trailers in that they have two wheels and the front end of the load is carried on the rear end of the towing vehicle, which is fittled with a fifth wheel. There is no body, the load being held in place by bolsters, one on the trailer and the other on the first wheel. The tongue or reach of the trailer is adjustable to handle material from 10 to 12 ft. to 50 ft. or more in length. One- or two-ton trucks are usually used to pull loads of two to

the improved highways. In several states trucks of more than five tons capacity are not allowed to be used on the highways, while in others the gross weight of vehicle and load is limited to twelve, twelve and a half and fourteen tons. Almost prohibitive registration fees amounting to from \$311 to \$2000 a year are exacted for trucks of seven tons capacity or more in some states for the purpose of discouraging their use.

In all forms of transportation it is well known that the larger the tonnage hauled of these types, the one-ton truck is converted into a three-ton unit, the two-ton truck into a five-ton vehicle and the five-ton truck or tractor into a twelve or fifteen-ton road vehicle.

In operation the cost of running a truck with a trailer is generally not over 25 per cent more than for operating it singly, as gasoline consumption is increased only 15 to 20 per cent, no extra driver is required and fixed charges are much lower on the trailer than on the truck. The economy of doubling the load while increasing the cost only one-quarter is obvious.

#### How Semi-Trailers Save Money

Trailers or semi-trailers used in relays avoid a great deal of expensive waiting time of truck and driver. For example, a big chain grocery store company which supplies forty retail stores from its Jersey City warehouse estimates that it saves 11/4 hours of loading time each day with each of its twenty tractors, or 30 hours daily. On a basis of \$24 a day as the operating cost of five-ton trucks, or \$2.40 an hour, the 30 hours saved are worth \$72 and in a year of 300 working days, the saving amounts to \$21,600. This is accomplished by employing thirty-seven six-ton semi-trailers. While the tractors are out with loaded trailers in the forenoon making deliveries, other trailers are being loaded at the warehouse for the afternoon trips. As the tractors return about noon,



Martin Rocking Fifth-Wheel Company's Two-Wheel "Flat Trailer" in Dumping Position

five tons, 20 to 50 per cent of the weight being supported by the towing vehicle.

### Truck Makers Recommend Use of

Some years ago leading truck manufacturers were strongly opposed to the use of trailers with their regular truck models except under the most favorable conditions of roads and use. Now, after investigating the results obtained by the use of trailers with their trucks, practically all well-known truck owners are favorably disposed toward trailers and recommend their use. At least two dozen truck companies build short-wheelbase road tractors especially for hauling trailers and semi-trailers. One company builds all its worm-drive models with a spring drawbar for pulling trailers as regular equipment.

These truck makers, as well as the trailer manufacturers and the users of trailers, have found that trailers double the hauling capacity of the trucks, greatly reduce waiting time of truck and driver for loading and unloading and consequently result in great hauling economy. By the use of trailers many hauling jobs can be done that would be impossible with trucks alone, as, for example, the handling of single objects too heavy, too big or too long to be loaded on the truck. Weights of ten to twenty tons and more are divided between truck and trailer so that neither is over-loaded and the weight is distributed over six to eight wheels instead of being concentrated on four.

#### Distribution of Weight Saves Roads

This is of importance in view of the tendency of state legislatures to restrict the weight and size of vehicles to preserve



Street Repair Work With Detroit Side-Dump Trailer

as a unit the lower is the ton-mile cost. So it is cheaper to haul ten or fifteen tons with a single truck than with two or three trucks or in two or three trips. This economy is secured by the use of trailers without violating the state laws.

Any motor truck has ample power to carry its own full load and to pull in addition a four-wheel trailer with an equal load, provided the roads are hard surfaced and fairly level. A motor truck or tractor can haul from two to three times its rated capacity on a semi-trailer. When a semi-trailer is used with a truck as a tractor, the truck body is removed and the front end of the trailer is supported on the rear end of the truck, thus dividing the load between the truck and the trailer wheels. With the pole trailer also the front end of the load is carried on the rear end of the truck. With either

they leave the empty trailers and couple up the loaded ones. Only eight to fifteen minutes are required to make the change, whereas the loading of a truck or trailer takes a full hour on the average. The trailers loaded in the afternoon are taken out the following morning, so the process of loading and distribution are going on simultaneously every day.

#### Economical Use of Large Units

An interesting system of using four-wheel trailers is employed by the Velick Scrap Iron & Machinery Co. in Detroit, which has solved its haulage problem in this way. It uses two five-ton trailers with each of its five-ton trucks. Leaving the yards with two empty trailers, the truck drops one at a factory and the second at another, then proceeds to a third, where it takes on a load of scrap itself.



# What is behind the success of Atterbury dealers

You'll find the reason here. Fact is, Atterbury owners are the best salesmen a dealer has

#### "Not a cent for repairs"

"Our 2½ ton truck has been in constant service over all kinds of roads, carrying an average of four tons weight most of the time.

"We have not had to spend a cent of money in repairs or even in minor adjustments during the entire season, nor has the truck been laid up for a minute for any reason whatever."

#### "Extra good in mud and snow"

"We consider the Atterbury truck as good a truck as there is on the market. We have run the truck for the last three months through all kinds of weather, and find it extra good in mud and snow."

#### "60,000 miles-still going strong"

"We have had an Atterbury 2½ ton truck in service since August, 1912.

"This car has covered approximately 60,000 miles.

"We have no hesitancy in recommending the Atterbury to any prospective truck buyer."

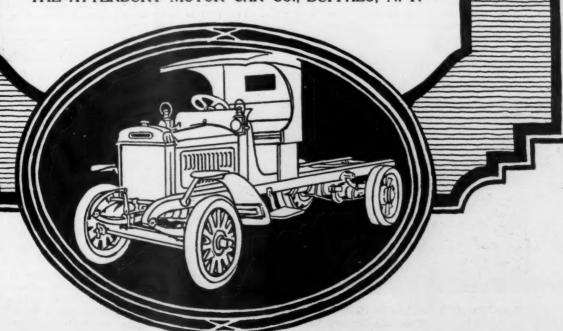
#### "Started with one-now operate ten"

"Starting as we did with one truck as a trial order, we have increased our Atterbury equipment until we now have a fleet of ten.

"Being satisfied and believing that we are getting full value for our money, we have adopted the Atterbury as our standard truck."

(Names of any of these users on request)

THE ATTERBURY MOTOR CAR CO., BUFFALO, N. Y.



Returning, it picks up successively the two trailers which have been loaded in the meantime, and arrives at the company's yards with fifteen tons or more of material instead of the five-ton load formerly hauled. At the yard one trailer is left alongside a freight car and the truck and remaining trailer pull up beside another car. A railroad crane unloads all three at the same time or in rapid succession. Where factories are running at night, trailers are left in the evening to receive scrap metal from the night's operation and are ready to be hauled away in the morning. This saves the company the cost of loading the stuff and avoids dumping of the scrap about the factory.

#### Fifteen-Ton Still Hauled Fifty Miles

An interesting case of heavy haulage with a truck and trailer ocurred in a remote section of the United States when the Midwest Refining Co., of Casper, Wyo., moved a 30,000-lb. still 50 miles from Casper to Salt Creek in 191/2 hours. The equipment used consisted of a 5-ton motor truck and two 21/4-ton trailers coupled together. The still was supported in a special timber cradle between the truck and trailers. As some heavy hills were encountered on the trip, a 2-ton truck was used as a "pusher" on these grades. Part of the trip was over virgin soil where no road existed. While the cost of this job is not stated, the great economy is evident from the fact that a short time previously a still of the same dimensions was taken over the same route with horses and required 36 horses and ten men and consumed 30 days. Such a comparison leaves no possible argument in favor of the latter method.

#### Lumber Hauling in America and Hawaii

More trailers are used in the haulage of timber and lumber, probably, than in any other one industry, because this is such a big industry and presents such difficulties in transportation. Trucks and two-wheel trailers are used extensively for bringing logs out of the forests. Where cutting is done too far from streams to roll the logs into the water, some means of haulage must be adopted to get them there or to the sawmill. Use of trucks and trailers avoids the expense of building a logging railway and also the danger of fire from sparks from the locomotives. The logs



Troy Three Ton Semi-Trailer
A new 1920 addition to the Troy line of four-wheel trailers

are usually too long and often too heavy to be loaded on a truck alone, but with a trailer any length of log can be hauled and the weight is divided between the truck and trailer, so that loads of 15 to 20 tons may be hauled.

The two-wheel trailer or semi-trailer is much used for hauling sawn lumber because they save the waiting time of truck and driver while loads are being made up and unloaded at destination. While one trailer is left in the yards to have a load made up, which may take an hour or two, the truck or tractor is on the road hauling another loaded trailer.

#### Semi-Trailer With Refrigerator Body

It is necessary in many climates to protect meats and perishable fruits and vegetables from extremes of temperature while being transported. The railroad refrigerator car principle has been applied to trailers and semi-trailers in the United States with success. The Post Office Department, for example, has moved a season's crop of mushrooms over a daily route into the Philadelphia market in trucks having closed bodies warmed from the exhaust of the engine. Morris & Co., the big meat packers, haul chilled beef and other meat products between the stockyards cooler in East St. Louis and St. Louis in special refrigerator bodies mounted on semi-trailers. The bodies are built like railroad refrigerator cars, and have walls and floor insulated with four inches of cork. The beef is hung from the ceiling and can be delivered in three of four hours without any perceptible rise of temperature. There are three of these semi-trailers for each tractor. The trailers have a load capacity of 15 tons each.

Great saving in time and money is effected by this system of transportation, as one tractor and three semi-trailers can haul about five carloads of meat a day at less cost than the charge of one railroad car. Delivery of one railroad car of meat between the two points, which are just across the Mississippi River from each other, costs \$30 and four or five days are required for the car to make the round trip.

#### Small Trailers Useful

It is not only in the moving of large and heavy materials and objects that trailers are used. A great number of small two-wheel and four-wheel trailers are used with passenger cars for general utility purposes. Farmers find them especially useful for taking small quantities of produce to market and for hauling live cows, pigs, sheep, poultry, etc. A passenger car will haul a load of 1000 lb. or more with ease, in addition to a full load of passengers in the car. Such a trailer, costing from \$50 to about \$300, according to type and size, will serve all the purposes of a small delivery wagon and in no way interfere with the ordinary use of the vehicle.

#### Operating Costs Vary

Of course the exact cost of trailer operation always depends on the conditions existing in the locality where it is used, just as truck operating costs differ widely in the same way, although on a larger scale. Realizing that the entire matter is one of proportion, the prospective trailer user can make a close estimate of what it will cost to double the hauling capacity of motor vehicles by the use of trailers.

#### Georgia's Ship-by-Truck Week

ATLANTA, GA., April 28.—The Georgia Automotive Dealers' Association in furtherance of the Ship-By-Truck Good Roads Week, May 17-22, has secured a proclamation by Governor Hugh M. Dorsey. A large part of the State will be included in two truck tours, and a Government recruiting truck with its powerful lighting system, and a brass band of thirty pieces will accompany the trucks. The tours are strictly educational, with no sales features.

The Portager, Vol. I, No. 1, Clyde S. Thompson, editor, published by the portage Tire & Rubber Co., Akron, is a new house organ containing general information of value.



Four-Wheel Trailmobile as Used With a Motor Truck in the Wholesale Grocery Business

# A Saving in Unsprung Weight in Every Capacity of

CLARK AXLES





Clark Internal Gear Axles are made in sizes from one to five tons capacity as illustrated. The pyramids show the saving in unsprung weight of Clark Axles as compared with other type axles.

UNSPRUNG weight is said to be ten times as destructive to tires as weight above the springs.

Clark Axles save from 200 to 700 pounds in unsprung weight—they are that much lighter than other types of axles of similar capacity—and yet they are stronger for a given weight.

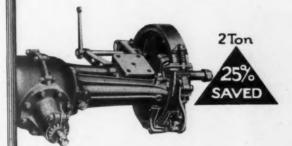
In Clark Internal Gear Axles most of the speed reduction is accomplished right at the wheels. Smaller torques and reaction strains require less weighty materials.

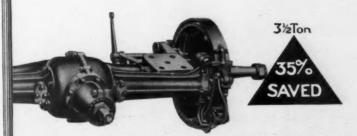
CLARK EQUIPMENT CO.
Buchanan, Mich.

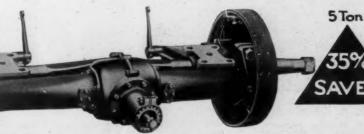
CLARK

EQUIPMEN

Build Good Roads
Ship by Truck







#### Personal Items

Godfrey H. Atkins has been made Western district manager of the Electric Storage Battery Co., and is in charge of all departments in Chicago, St. Louis, Kansas City, Minneapolis, and Denver.

L. M. Baker has resigned as supervisor of sales of motor equipment division Hyatt Roller Bearing Co. and takes over the exclusive representation in Michigan of the Dittmer Gear & Mfg. Co., Lockport, N. Y.
Orin S. Beroth, former service manager of the Indiana Truck Corp., has become director of service in the motor truck division of the Stoughton Wagon Co., Stoughton, Wis.

H. J. Butler is now sales manager for the Oneida Motor Truck Co., Green Bay, Wis., vice C. J. Welsh. He was formerly Chicago manager of the Edison Storage Battery Co.

C. W. Butterfield, who has been four years with the Dynoto Electric Corp., Syracuse, has been made sales manager of the Herschell-Spillman Motor Co., North Tonawanda, N. Y.

F. B. Caswell, sales manager of the Champion Snark Plug Co., sailed for Flynore America

has been made sales manager of the Herschell-Spillman Motor Co., North Tonawanda, N. Y.

F. B. Caswell, sales manager of the Champion Spark Plug Co., sailed for Europe April 20 to establish branch offices in London and Paris. E. L. Brown, sailing with him, will become manager of the foreign business.

Hamilton Clive has been appointed central territorial sales manager for the Standard Motor Truck Co.

H. J. Crean, assistant secretary-treasurer of Fisher-Wilkle, Ltd., Sandwich, Ontario, has been appointed assistant to the president of The Collier Motor Truck Co., Bellevue, O. Arthur Dixon has been made advertising manager of the Torbensen Axle Co.

J. H. Dutch has been made special representative of the manufacturers' sales department of the Firestone Tire & Rubber Co., with offices at Detroit.

Robert Enos has been made general manager of the Torbensen Axle Co.

G. J. Eyler has been made sales manager of the Torbensen Axle Co.

G. J. Eyler has been made sales manager of the Service Motor Truck Co., Wabash, Ind. Formerly with Delco Light Co., Dayton. Edward Fraer Carson, for the last two years sales and advertising manager for Acheson Graphite Co., Niagara Falls, has resigned and has assumed a similar position with White Hickory Motor Corp., Atlanta.



Major A. G. Stevens Head of the highways transport division of the Goodrich Travel and Transport Bureau, Akron, Ohio.

L. B. Graham, Chicago, has been appointed general sales manager of the Denby Motor Truck Co., Detroit. He was formerly whole-sale distributor for Apperson Bros.

Dwight T. Hersey has become sales manager of the Jenkins Vulcan Spring Co., Richmond, Ind., makers of replacement springs for cars and trucks.

Hoover Holton has been appointed manager of the Chicago branch of the Kelly-Springfield Motor Truck Co., which has a new building, Michigan Ave. and 25th St.

Jo. M. Lake is now general sales manager of the Sanford Motor Truck Co., Syracuse. He was associated with the Chase Motor Truck Co., and later spent nearly two years with the Engineering Corps, in France.

S. K. Miller has been elected vice-president of the Kentucky Wagon Mfg. Co. He has been the company's general sales manager.

William W. Nevins is now a factory representative for ten southern states, with office at 197½ Edgewood Ave., Atlanta. He has covered this territory for five years, and has a very good acquaintance with all the jobbers. Mr. Nevins is open to consider one or two more good lines of responsible manufacturers of automotive equipment.

M. J. O'Connor, for fifteen years connected with the tire industry, and with the McLean Tire & Rubber Co., East Liverpool, Ohio, since its organization, has been appointed the company's New England manager, with headquarters at 119 Chandler St., Boston. Frank O'Connor, a brother, is associated with him.

Albert M. Pearson, general sales manager of the Defiance Motor Truck Co., has been

Frank O'Connor, a brother, is associated with him.

Albert M. Pearson, general sales manager of the Defiance Motor Truck Co., has been made assistant general manager, and has been made a director of the company.

Raymond E. Plimpton, former publication manager and field secretary, S. A. E., is with the Wales Advertising Co., New York, and will handle technical and semi-technical advertising campaigns.

C. B. Rice is manager export department, 25 Beaver St., New York, for the truck and tractor division of Traylor Eng. & Mfg. Co.

Daniel S. Roper has been elected president and a director of the Marlin-Rockwell Corp., and A. F. Rockwell, founder of the firm, was re-elected chairman of the board of directors.

Frank J. Rowan is export sales supervisor for United States trucks in Great Britain, and recently visited the factory in Cincinnati.

H. S. Schott has been announced by The land, Akron, Youngstown, Erie, Pittsburgh, American Ever Ready Works of the National Carbon Co., Long Island City, as eastern sales manager. Mr. Schott came to the company as a clerk in 1913. He succeeds J. H. Sommers, resigned.

George A. Stracke has taken charge of the advertising of the Standard Motor Truck Co. He was formerly with the Campbell-Ewald Co.

C. D. Studebaker has been appointed dis-

He was formerly with the Campointed dis-Co. C. D. Studebaker has been appointed dis-trict sales manager of the Firestone Tire & Rubber Co., and has eight branches: Cleve-Buffalo, Rochester and Syracuse. He has been seven years with the company. W. M. Todd has been appointed sales man-ager of the sales department of the Southern Truck & Car Corp., Greensboro, N. C.

Truck & Car Corp., Greensboro, N. C.
N. H. Van Sicklen has resigned as president of the Van Sicklen Speedometer Co., Elgin, Ill., and C. W. Curtis becomes president and general manager, with offices at Newark, N. J. N. H. Van Sicklen, Jr., becomes vice-president, at Elgin. N. D. Church becomes chairman of the directors, with headquarters at Los Angeles.

A. F. Wilkins, purchasing agent of the Republic Truck Company, Alma, Mich., has resigned to become purchasing agent for Wisconsin Motors, Milwaukee. H. J. Bunn succeeds Mr. Wilkins.

#### Personal-Retail Trade

Murray R. Bird, Rockford, Ill., has resigned after nine years service as district manager for the Packard Motor Co., and is succeeded by Karl C. Wettstein, from the factory. The office takes care of ten counties.

Warren Casey is the new manager of the Atchison, Kan. Tire Co., specializing on Victor Springfield tires, and Ford parts.

J. B. Clarkson, Sydney, Australia, has made his fifteenth trip around the world to place an order for American built trucks. He has traveled over 1,500,000 miles since 1903. He has made the Sydney-London trip 14 times, crossed the American continent 23 times, the Atlantic 11 times during the war, and 22 times before the war. He frankly admits the superiority of design of American-built cars, and particularly trucks. He made this fifteenth trip around the world to obtain the contract with the Dearborn Truck Co., Chicago, for the sale of Dearborn trucks in Australia.

Charles B. Ennis has resigned as general manager of Anderson Motor Sales Co., Charlotte, N. C., to become general sales director of the Beam Motor Co., Inc., Packard dealers for North and South Carolina.

Ollie E. Haupt Motor Co., Ford agents, have just completed a \$100,000 sales building at Olive and Whittier Sts., St. Louis. Show room is in gray tile, finished in mahogany.

Hartley Howard, Jr., associated with the company in Pittsburgh for ten years has been made vice-president of the Packard Motor Company.

Frank A. Lobee & Son, Buffalo, have the agency for the Armleder truck in that city.

William J. Male, for four years director of the Stewart Motor Corp. factory sales division, has resigned and will distribute Stewarts for Buffalo and vicinity. He is forming and heading Male Motor Truck Co.

E. C. Poole and George S. McGhee, Dallas, Texas, have organized the Armleder Motor Truck Sales Co. of Texas, for state sales of that truck.

L. G. Schoefilin Co., representing the Stewarts for Buffalo and vicinity. He is forming and heading Male made city manager of Traffic Motor Truck Corp., St. Louis.



C. D. Fleming Treasurer of the Cleveland Tractor Company, Cleveland, Ohio.



R. A. Kiken Who was recently appointed service manager of the Buda Company, Harvey, Ill.



J. H. Wise Who is investigating truck conditions in South America for the Selden Motor Truck Company, Rochester, N. Y.



H. P. Mills Who is the credit manager of the Acason Motor Truck Com-pany, Detroit, Michigan.



J. H. Thompson Who is manager of the recently established New York factory of the Four-Wheel Drive Automobile Co., Clintonville, Wis.



The Moto-Meter Company, Inc., together with Harrison H. Boyce, have filed suit in the United States District Court, Northern District of Ohio, against the F. B. Stearns Company, claiming the latter infringes the Moto-Meter Patent No. 1,275,654, which was granted to Boyce and filed in the patent office during 1912. Boyce and The Moto-Meter Company, Inc., ask for an injunction and the counting of profits and damages and for such other further relief as to the Court may seem just.

The Hamilton Motors Co., Grand Haven,

may seem just.

The Hamilton Motors Co., Grand Haven, Mich., Apex truck makers, have increased their capital stock from \$500,000 to \$1,500,000. In addition to increased floor space now being provided it is intended to double present manufacturing facilities. The increased capital has been subscribed by Adolf Pricken, a prominent real estate operator of New York City.

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Columbus Motors Co., Detroit, has increased its capital from \$500,000 to \$6,000,000. The company has two large plants in Detroit, and has bought a large tract, upon which immense factories will be built. All the new stock, issued eight of new to one of old, was taken by the present stockholders.

The Hercules Motor Mfg. Co., Canton, Ohio, has purchased a complete foundry in order to produce its own grey iron casting requirements for engine production. Sixty-five tons per day can be made by this subsidiary Motor Castings Co., capitalized at \$500,000, with R. W. Gallagher, president; Charles Balough, vice-president; and George W. Russell, secretary and treasurer.

The Miller Rubber Co., Akron, will build three factories at a cost of \$861,000.

The Mason Tire & Rubber Co. and allied companies, Akron, will build a \$100,000 dormitory for women workers, and several score of homes for employees at Kent, Ohio.

The Cole Motor Company's plant in Indianapolis kept a liberal supply of engines, made in Detroit, despite the railroad strike, by contracting with a motor truck company for all of its trucks, and a truck train carrying eighty-seven engines made the run from Detroit to the Cole factory. E. J. Giddings, material and traffic manager for the Cole company made and carried out the enterprise.

The McDole Automobile Sheet Metal

company made and carried out the enterprise.

The McDole Automobile Sheet Metal Works, Kalamazoo, Mich., announces the reorganization of its business, increase of capital, and incorporation under the name of Automotive Sheet Metal Co. Officers of the new company were: C. B. McDole, president; D. A. Stewart, vice-president; O. D. Rose, secretary, and C. S. Campbell, treas.

Napoleon Motors Co., Traverse City, Mich., recently presented to every employee of the company a \$1000 life insurance policy, handled by the Mctropolitan Company.

The Miller Rubber Co., Akron, announces the opening of new factory branches in Philadelphia, Detroit, and Grand Rapids, for wholesale distribution of the Miller Geared-to-the-Road tires. This company recently increased its capitalization to \$60,000,000 to care for an oversoid condition. The Akron plant covers 24 acres, with 1,012,162 sq. ft. floor space in 20 buildings, with 6000 work-men.

The Bassick Mfg. Co., 361 W. Superior St.

men.

The Bassick Mfg. Co., 361 W. Superior St., Chicago, is the organization that has taken over the Alemite Die Casting & Mfg. Co., Lubricator Division, only. The new organization is a Delaware corporation. E. W. Bassick, Bridgeport, Conn., president; D. F. Fesler, Chicago, vice-president and general manager; C. I. Overton, Chicago, vice-president and sales manager; J. H. Youngquist, Chicago, purchasing agent.

#### Factory News and Capital Increases

The Republic Truck Co. has opened its Fifth National Republic Parts Depot in San Francisco, Fourth and Welch Sts. G. H. Peery is the manager.

The Roller-Smith Company, 233 Broadway, New York, makers of electrical meters and circuit breakers, has appointed the American Manufacturers instruments.

Export and import Corp., Seattle, Wash., as its agent for China. This concern also represents the Wagner Electric Mfg. Co. and several other large American manufacturers of electrical apparatus.

The Champion Spark Plug Co., Toledo, for the last six months, has entertained the salesmen of some of the largest representative jobbing houses in the country handling automotive equipment. The salesmen go through the factory in groups of ten, then journey to Detroit and study porcelain making in the Champion insulator factory, Jeffery-Dewitt Co. Two days study, a dinner, and a theatre party complete the program of good-will building.

The Falrbanks Company's Automobile and Service Station Equipment Division held another convention and clinic the last of March in its New York offices. Talks were given by Fairbanks managers, and on the second day a mechanical clinic or demonstration was given, and a display of the model repair shop. Attendance was large.

The Simms Magneto Co., East Orange, N. J., are building a factory extension, enabling them to turn out from 1300 to 1500 magnetos a day. The addition will be complete August 1.

The American Grinder Co., Milwaukee, Wis., producers of the well-known Black-

magnetos a day. The addition will be complete August 1.

The American Grinder Co., Milwaukee, Wis., producers of the well-known Blackhawk steel socket wrench, has found it necessary to recapitalize in order to meet the demand for its product. Herbert Brumder, of a Milwaukee firm of bankers, becomes treasurer. Sales are in charge of C. N. & F. W. Jonas, Chicago, with branches at Los Angeles, Seattle, San Francisco, Dallas, New York and Atlanta.

The Bethlehem Motors Corp., Allentown, Pa., is making its great, enlarged plant one of the notable ones of the country. An enormous hill is being blasted, to create more space, and the trucks made by the company are removing the material.

Paul G. Niehoff & Co. have increased production by taking over the Northern Machine Co. and its entire equipment at 341 East Ohio St., Chicago, leasing the premises, which they will operate, as well as their present plant at 232-242 East Ohio St. A new line of electrical testing instruments will be produced.

The Fisher Body Ohio Co., Cleveland, has let the contract for building a new \$200.000.

be produced.

The Fisher Body Ohio Co., Cleveland, has let the contract for building a new 880,000 sq. ft. space factory to the Thompson-Starrett Co. The main body plant will be six stories, 74 x 1150, with a mill building of two stories, 300 x 500, and four other large buildings. All the concrete work is to be finished by October 1. Machinery will be installed upon each floor as fast as completed.

Standard Parts Co., Cleveland, has acquired the Canadian rights to the Lloyd oxyacetylene method and machinery for manufacturing steel tubing from the Automatic Welding Co. of Menominee, Mich. The method was patented in 1910. Standard Parts also controls the American rights.

The Maluminum Castings Co., 1120-30 East Georgia St., Indianapolis, has taken over the Kramm Foundry Co., and will enter all the branches of the aluminum bronze and casting business, while specializing upon their patented alloy, maluminum. The new company will have \$1,000,000 capital. H. D. Kramm is president; H. E. Smith, vice-president; W. H. Breeden, secretary and treas.

The Goodyear Tire & Rubber Co. has completed arrangements with the Brazilian government for the erection of a South American factory just outside the city of Rio Janeiro. Construction has begun and the new factory, it is expected, will be completed within a year and a half. Four buildings will be so built as to allow for expansion. At first 1000 employees, mostly Brazilians, will operate the plant, with capacity of about 1500 tires and tubes a day. This is the fourth city in which Goodyear will have a factory.

The Morse Chain Co., Ithaca, N. Y., have moved their offices from Greensboro, N. C., to Charlotte, N. C., 404 Commercial Bank Building. H. E. Matthews continues with the company.

will have a factory.

The Morse Chain Co., Ithaca, N. Y., have moved their offices from Greensboro, N. C., to Charlotte, N. C., 404 Commercial Bank Building. H. E. Matthews continues with the company.

The Carborundum Co., Niagara Falls, N.Y., is expending about \$500,000 enlarging and improving its gigantic plant and its two great furnace plants, one at Niagara Falls, Ont., and one at Shawinigan Falls, Quebec. One three-story unit, 91 x 431 is completed. The complete program involves the enlargement of fourteen departments.

The Walker-Johnson Truck Co. has filed certificate with the Massachusetts Commission of Corporations, increasing capital from \$500,000 to \$3,500,000.

The Cincinnati Rubber Co. has increased its capital from \$250,000 to \$1,000,000.

The Federal Motor Truck Co. will increase capital from \$250,000 to \$1,000,000.

The Minerva Engine Co., Cleveland, has increased capital from \$250,000 to \$1,000,000 to provide manufacturing facilities.

The General Motors Corp. in their Remy electric division, Anderson, Ind., have secured an agreement on the part of officials and employees for a schedule of longer working hours, for increased production, with better wages. About 4000 men and women enter the agreement and the new system replaces the day and night shift plan. There will be ten hours pay, and Saturday afternoon holiday.

The General Motors Corp. has bought the Monmouth County Fair Ground at Red Bank, N. J., as a site for demonstrations, and a distributing plant for tractors, electrical devices, and lighting plants for farms and suburban residences. The property comprises sixty acres situated on both the Pennsylvania and the Jersey Central railroads.

The Central Auto Top & Leather Co., a partnership since 1912, has been incorporated in Indiana, with capital of \$75,000, and besides tops and covers will now make belts clutch leathers, and every will now make belts. Charles Swoboda is president; Chester A. Carlisle, vice-president; Chester A. Carlisle, vice-president; Chester A. Carlisle, vice-preside

#### **New Agencies**

The Perfection Storage Battery Co. announces several important distributor organizations. The Perfection Battery Service Station, Inc., 1417 Maryland Ave., Baltimore, Md., for Maryand and Delaware. Edward C. Daniels, Rutherford, N. J., for New Jersey. Farmers Delight Co., 413 Lyric Building, Richmond, Va., for Virginia, and North and South Carolina. N. L. McMains has been assigned the middle Wester territory, for the states between the Mississippi and the Rockles. The Electrical Equipment Co., Auckland, New Zealand, have been made exclusive distributors for New Zealand, and the Ramsey Sharp & Co., Sydney, for the Commonwealth of Australia; while the Eastern Electrical & Trading Co., Bombay and Karachi, exclusivey represent India.

The Auto Repair Co., Winston-Salem, N. C., has obtained an amended charter changing its name to Auto Repair and Sales Co., and increasing capital from \$25,000 to \$100,000. Have Overland, Willys-Knight, Roamer, Oldsmobile, and Garford trucks.

John B. Waite, who has been wholesale manager in Chicago for the Reo car, is now associated with I. J. Bell, and W. B. Bell, Rockford, Ill., organizing the \$50.000 capitalized Rockford Automotive Corporation, at 506 Church St., and will distribute the Odsmobile, Hupmobile, and Marmon cars, and the Oldsmobile truck.

The Lebon-Kidd Co., are the new distributors of Republic trucks for Boston, Mass., territory, and are at 983 Commonwealth Ave., in a building 100 x 175.

Claude L. Thomas Automobile & Tractor Co., Bowling Green, Ky., has taken the agency for the complete line of Nash passenger cars and trucks.

The Times Square Automobile Co., with a capital of \$50,000 has been reorganized to engage in wholesale equipment business throughout the United States. President Jesse Froelich announces that branches will be opened in every city of more than 75,000 population. One of the directors is Allan A. Ryan, The company will give up its retail business gradually. The new branches will be wholesale jobbing houses exclusively. Locations have been obtained in Los Angeles and San Francisco, and the first business done will be on the Pacific coast.

#### Removals and Trade Changes

The Firestone Tire Co. has established a direct factory branch in Louisville for Kentucky distribution, W. E. Difford, of Akron.

direct factory branch in Louisville for Accincted distribution, W. E. Difford, of Akron, being manager.

T. H. Ball and Staff, technical advertising, to more efficiently accommodate a larger organization have opened new offices at 204 Marion Bidg., Cleveland, Ohio.

The Imperial Brass Mfg. Co. has its New York office now in Suite 605 Longacre Bidg., 42nd St. and Broadway. C. E. Young is manager of sales promotion.

The Electric Storage Battery Co. has been moved from 100 Broadway New York, where it has been for about 25 years, to the National Assn. Bidg., 22 West 43rd St. .F. L. Kellogg is the New York manager.

The Roller-Smith Co., 233 Broadway, New York, announces the removal of its Cleveland office from the Williamson Bidg. to the Vickers Bidg., 65th St. and Euclid Ave.

J. H. McCullough & Son have moved from 219 N. Broad St. to 257-259 N. Broad St. Philadelphia, with 20,000 sq. ft. floor space.

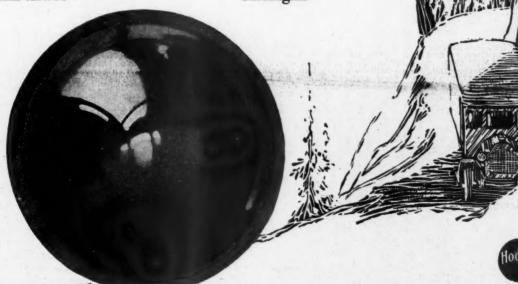


The Goodyear Akron to Boston Express

Continents are mere toys to modern motor truck transportation. Little ball bearings working on marble-sized balls, by relieving friction's strains and making smoother power, make spanning continents by motor truck possible.

Fashioning heat-treated steels into perfectly round and smooth steel balls which cushion road shocks and friction—which give more direct power and conserve the life of mechanism—is the Hoover Steel Ball Engineers' contribution to the progress of highway transportation.

HOOVER STEEL BALL COMPANY
Ann Arbor Michigan



HOOVER STEELBALLS The Wellman-Seaver Morgan Co. has moved its Manufacturing Sales Department of rubber equipment and machinery, in charge of L. N. Ridenour, from the company's Akron office to its general offices, 7000 Central Ave., Cleveland, Ohio.

The Haywood Co., engineers San Francisco, and Shanghai, China, have moved the San Francisco office to 1011-13 Hearst Bldg.,

cisco, and Shanghai, C San Francisco office to Third and Market Sts.

#### Trade Literature

Motor Vehicle Engineering, (engines for automobiles, trucks, and tractors), by Ethelbert Favary, member S. A. E., consulting engineer, lecturer on motor vehicle design, Cooper Union, New York, has its second edition off the press of the McGraw-Hill Book Co., Inc., 239 W. 39th St., New York. This book is written for the designer and automobile engineer and aims to give in concise and simple language the information needed.

A Bulletin on Drag Links, for automobile, truck and tractor service, containing information drawn from the experience of the engineering and manufacturing departments of The Steel Products Co., Cleveland, Ohio, will shortly be distributed by that firm to motor vehicle manufacturers.

The Automobile Storage Battery is a book issued by the American Bureau of Engineering, Chicago, and it makes the so-called mysteries of the battery as plain as A B C. Chapters dealing with shop work and tools are invaluable to the garage mechanic. The book is used by the Ambu Eng. Institute, Chicago, and contains a preface by O. A. Witte, chief engineer of the Bureau.

#### New Incorporations

The Riggleman Refrigerator Truck Co. has been capitalized for \$250,000, to make refrigerator motor trucks.

The Northwind Spark Plug Corp., 42 W. 39th St., New York, has been formed to take over the production on a commercial scale of the Northwind spark plug, and has established a plant at Union Hill, N. J. Shipments will begin about May 1.

The Powell Pressed Steel Co. Hubbard, Ohio, has been formed and is building a plant for producing light and heavy pressed steel stampings. By July first manufacturing will begin. The most intricate pressed steel work will be done. Temporary offices are at 206 Dollar Bank Bldg., Youngstown, Ohio. W. J. Powell is president and general manager. H. S. Wylde is vice-president and sales manager; E. J. Powell is secretary and engineed; Ward Beecher is treasurer; and J. L. Doyle is purchasing agent.

The Van Sicklen Speedometer Co., Elgin, Ill., has been incorporated with capital stock of \$2,500,000 of which \$1.094,000 is employed in the Illinois branch. The incorporation is a legal formality.

The Claudel Carburetor Co., Inc., Dover, Del., has been formed to manufacture and sell carburetors, with capital of \$500,000.

The Daniels Motor Co., Dover, Del., has been formed with capital of \$500,000.

The Union Motor Car Corp. has been formed in Dover, Del. Capital \$1,000,000.

The Kurtz Motor Car Co., Cleveland, Ohio, has been formed, with capital of \$525,000.

The Solon Tire Co., Cleveland, Ohio, has been formed, with capital of \$525,000.

The Rubber Corp. of America has been formed with \$2,000,000 capital to take over the sale of all products of the Empire Rubber & Tire Co., Trenton, N. J.; the Sterling Tire Corp., Rutherford, N. J., and another concern in the Middle West.

cern in the Middle West.

The Highway Motors Co. has been incorporated under the laws of Ohio for \$1,500,000, half preferred, and half common stock. Charles F. Kettenring, Defiance, is president; R. P. Kettenring, vice-president; J. W. Wright, secretary and treasurer, in charge of sales and advertising. The corporation takes over the plants, good will, and business, of Golden, Belknap & Swartz Co., and the Fruchery Machine Co., of Detroit. Minimum of 150 engines a day.

mum of 150 engines a day.

The Thomart Motor Co. has been incorporated under a Delaware charter by prominent Akron, Ohio, men, and has purchased the large plant of the Seneca Chain Co., Akron, and will manufacture and sell trucks. Capital is \$5,000,000. The firm will specialize upon a light ¾-ton capacity job to be known as the "Thomart" truck. Acreage for plant expansion has been secured. W. G. Thompson is president; James L. Stewart, vicepresident; B. A. Shribner, secretary and treasurer. treasurer.

#### A. E. A. Activities

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The Automotive Equipment Association held its first joint mid-convention meeting of the Board of Directors and the Membership Committee at the Old Colony Club, Chicago, Ill., Tuesday and Wednesday, March 30-31. W. L. Moncur, of Toronto, was placed upon the Membership Committee, vice E. D. Waite, of Providence. Through favorable report by the Membership Committee, and election by the directors, it has received the following jobbers into its membership: Automotive Equipment Co., Newark, N. J.; Consolidated Grocery Co., Jacksonville, Fla.; Dayton Iron & Steel Co., Dayton, Ohio.; Cronin Co., P. J., Portland, Oregon; General Auto Supply Co., Lancaster, Pa.; Kimball-Upson Co., Sacramento, Calif.; Kopac Brothers, Omaha, Neb.; Lomont & Co., Fort Wayne, Ind.; Mid-West Auto Supply Co., Dubuque, Ia.; Motor Accessories Co., Allentown, Pa.; Robinson Brothers Co., Louisville, Ky.; Strauss, Inc., Joseph, Buffalo, N. Y. After favorable report by the Membership Committee and election by the directors, the association has received the following manufacturers into its membership: American Bureau of Engineering, Inc., Chicago, Ill.; Alvord Reamer & Tool Co.; Millersburg, Pa.; Apex Electric Manufacturing Co., Chicago, Ill.; The Carborundum Co., Niagara Falls, N. Y.; Conant & Donelson Co., Conway, Mass.; Federal Brass Co., Chicago, Ill.; National Lamp Works of General Electric Co., Cleveland Ohio; Neville Steering Wheel & Mfg. Co., Detroit, Mich.; Presto-Felt Mfg. Co., Toledo, Ohio; Stewart Mfg. Co., Oakland, Calif. In order to take advantage of railroad fares taking effect June first has substituted the second week in June for the first week, originally set, for the Del Monte, Calif., convention. June 7 and 8 will be devoted to meetings of directors and committees. June 9 will be devoted to entertainment by the California hosts, and the general meetings will be held June 10, 11, and possibly the first days of the following week.

contract, the electrotype remaining the absolute property of the Association. The emblem will also be copyrighted in Canada and Director Millen of Canada is taking care of the details of this plan.

The California Auto Trade Assn. held its regular southern division meeting April 23-24 at Long Beach. The next meeting of the division will be in October.

The South Carolina Automotive Trade Assn. will hold its semi-annual meeting at the Isle of Palms, a resort near Charleston, June 24-25. Harry B. Harper, Philadelphia, Ray W. Sherman, New York; and J. C. Munn, Toledo, have been invited as speakers.

State Associations are multiplying. Harry G. Moock, general manager of the N. A. D. A. has sent out a general call to ascertain if Kentucky is ready. The Illinois trade was recently organized by him at Springfield. Indiana and Tennessee will soon follow. Missouri and Oklahoma are considering doing so. Arizona has been organized. The Intermountain Dealers Association has just been organized at Salt Lake City, with Charles Backes, secretary manager, and offices at 210 Judge Building. This association embraces Utah, northern Nevada, southern and central Idaho, and western Wyoming.

The N. A. C. C., because of strikes, cannot occupy its new quarters in the Marlin-Rockwell Building, Madison Ave. and 46th St.

The Motor Truck Club of Massachusetts held its first banquet in March. State Commissioner of Public Works was the principal speaker and pointed out the important role of the truck in solving transportation problems. David Harper, first president of the Motor Truck Club of New Jersey also spoke. The Massachusetts club will take an active interest in legislative matters.

#### Association News

Fred C. Ziliman is secretary of the newly organized Illinois Automotive Trade Assn.,

Fred C. Ziliman is secretary of the newly organized Illinois Automotive Trade Assn., at Springfield.

Manufacturers and the N. A. C. C. are actively at work upon the problem of automobile freight car supply. Dealers are being urged to make daily visits to freight yard depots, and unloading platforms and note and report violations of the Railroad Commissioner's orders that these freight cars must either be sent empty to the manufacturing territory or be given loads that will take them to destinations in that territory. Hundreds of coal cars, vitally needed for coal mining, are used in antomobile service, depleting the mines of such cars.

The Toronto Automobile Trade Assn., Ltd.,

The Toronto Automobile Trade Assn., L has elected G. M. MacWilliam president; A Thompson, first vice-president; R. C. I gour, second vice-president; and W. Bewell, secretary and treasurer.

## SERVICE CONVENTION IN INDIAN-

The N. A. C. C.'s newly creative service division will hold, as its first important effort, a convention in Indianapolis May 24-26. The program will treat of the service situation, first from outside the service department and then from within, the owner's viewpoint and the dealer's service department's point of view. The convention's third day will be spent in visits to study the layout and conduct of Indianapolis service plants.

#### Valuable Herd Moved by Motor Truck

One of the best demonstrations of the efficiency of the motor truck in handling stock was given by the Des Moines Mo-tor Truck Dealers' Association recently when eighty-five blooded Jersey cattle belonging to E. T. Meredith, secretary of agriculture, were moved from Fairview Farm, southwest of Des Moines, to the Meredith Farm at Lovington station, fourteen miles away. The herd is valued at \$150,000, and it was very necessary to move the cattle with as little disturbance as possible.

Four hours was the time from the start to the finish of the job, which included loading and unloading, photographing at various places and parading through Des Moines. At the head of the parade was the \$60,000 bull, Financial Beauty's King, who seemed to enjoy his joy ride in a motor truck.

Among the cows in the truck train several have a test record of between 800 and 1000 lb. of butter a year, and the average for the herd is over 650 lb., as compared with ordinary cows' 150 lb.

The motor trucks moving the cattle were the Federal, Transport, Master, International, G.M. C., Apex, Republic, Standard, Selden, Diamond T., Stewart, Reo, Autocar, Traffic, Sandow, Clydes-dale, Service and Independent. After the job was done the following statement was made by Lynne F. Townsend, manager of the farm:

"We are wonderfully well pleased with the whole adventure. The cattle came

through in the very best possible shape. There was not a single injury of any kind and no appreciable falling off in milk for even a single milking. The cattle were in the new barn two and a half hours before they were milked in the evening and were not in the least upset by their ride and the change in location.

"When we compare this fortunate situation with that which would have prevailed had we been compelled to ship the cattle by train, we feel doubly pleased. At the very best the latter method would have meant the loss of at least one milking, always a serious matter with high producing cows of this type. Added to this the bumping and jostling incident to moving by train always affords a serious

# The Resiliency is Built in the Wheel

# A Resilient Rolling Equipment

# Hundreds of Motor Truck Distributors

Have and Are

# Recommending to Their Trade

Many of the leading motor truck distributors have experienced a farreaching effect with their trade by recommending Sewell Cushion Wheels.

## Here Are the Reasons

It is a well-known fact to truck distributors that a Sewell-equipped truck has a longer life with more continuous service, and rarely frequents their service stations.

The savings which Sewell Cushion Wheels register each working day greatly increase the good-will of the trade toward their trucks with the result that the re-ordering of the same make truck equipped with Sewell Cushion Wheels is a common occurrence.

Therefore, the distributor feels himself well repaid for recommending:

The Time-Tested, Road-Tested,

Efficient and Economical Sewell Cushion Wheels Sewell Cushion Wheel Co., Detroit



#### Metal and Rubber Markets

#### Steel Still Subject to External Influences

Steel plants have shown such slow improvement from conditions caused by the railroad men's strike, which is not yet ended despite reports to the contrary, that observers in the industry doubt if the April production will be more than on the ratio of 25,000,000 tons a year. The steel industry was well on to recovery from the strikes of last year when the railroad embargoes again placed a check on the nearing to normal of the steel market.

#### Copper Steady

There was little change in copper lately. Large producers maintained their steady April quotations of 191/4c for prompt and second quarter delivery and 191/4c to 191/2c for July shipment, although smaller selling agencies shaded these quotations slightly. The open market price is about 19c flat, despite some offers on the Metal Exchange late in the week around 185%c to 1834c for May and June.

#### Steel Products Prices

| Per ton-Pittsburgh- |               |  |
|---------------------|---------------|--|
| Bessemer billets\$7 | 70 00 a 75 00 |  |
| Open hearth 7       | 70 00 a 75 00 |  |
| Forging billets 8   | 80 00 a 90 00 |  |
| Sheet bars 6        | 65 00 a 85 00 |  |
|                     |               |  |

|         |            | 5     | nee | ts  |           |      |     |
|---------|------------|-------|-----|-----|-----------|------|-----|
|         |            |       | are | for | 10-bundle | lots | and |
|         | o. b. mil  |       |     |     |           |      |     |
| Blue    | Annealed   | Sheet | g   |     |           |      |     |
| Pittsbu | rgh (base) | )     |     |     | \$4 50    | a 6  | 50  |
|         |            |       |     |     | 4.725     |      |     |

| Philadelphia 4                   |     |     |   |    |
|----------------------------------|-----|-----|---|----|
|                                  | 27  |     |   | 27 |
| Galvanized Sheets of Black Sheet | Gar | uge | _ |    |
| Pittsburgh \$7                   | 00  | a   | 9 | 00 |
| Chicago 7                        | 27  | a   | 9 | 27 |
| Tin-Mill Black Plate-            |     |     |   |    |
| Pittsburgh \$4                   | 35  | a   | 9 | 00 |

#### Structural Material

| Structural<br>Structural |         |    |      |     |    |   |  |  |
|--------------------------|---------|----|------|-----|----|---|--|--|
|                          | Pinich. | .4 | Team | and | C. | 1 |  |  |

#### Finished Iron and Steel

| Steel hoops                  | \$5 | 00 | a | 6  | 00 |
|------------------------------|-----|----|---|----|----|
| Tank plates, Pittsburgh      | 3   | 75 | a | 4  | 25 |
| Tank plates, New York        | 4   | 02 | a | 4  | 52 |
| Steel bars, New York         | 4   | 27 | a | 4  | 77 |
| Steel bars, Pittsburgh       | 4   | 00 | a | 4  | 50 |
| Rails-Standard Bessemer sec- |     |    |   |    |    |
| tions, mill                  | 55  | 00 | a | 65 | 00 |
| Standard, open hearth, mill  | 57  | 00 | a | 64 | 00 |
| Light sections-25 & 45 lbs   |     |    |   |    | 50 |

#### Iron and Steel at Pittsburgh

|                      |  |  |  | _ |  |
|----------------------|--|--|--|---|--|
| Bessemer<br>Bessemer |  |  |  |   |  |

| Skelp, grooved, steel 3  | 75    | a | 5 50  | į |
|--------------------------|-------|---|-------|---|
| Skelp, sheared, steel 4  | 00    | a | 5 75  | ì |
| Ferromanganese (80%)250  | 00    | 3 |       |   |
| Steel, melting scrap 27  | 00    | a | 28 00 | ) |
| Steel bars 4             | 00    | a | 4 50  | ) |
| Wire rods 70             | 00    | a | 75 00 | j |
| Iron bars 4              | 25    | a | 4 50  |   |
| Plain wire 3             | 50    | a | 4 50  | ) |
| Plain wire, galvanized 3 | 70    | a | 4 45  | i |
|                          | 191/2 | a |       |   |
| Wire nails, Pittsburgh 4 | 50    | a | 5 50  | } |
| Steel hoops 5            | 00 .  | a | 6 00  | ) |
| Chain rods               | 00    | a | 70 00 | ) |

OTHER METAL PRODUCTS .- Following are the prices current for brass and bronze products:

| Copper sheets, not rolled\$29 | 50 | a |       |
|-------------------------------|----|---|-------|
|                               | 00 | a |       |
|                               | 50 | a | 35 50 |
| Seamless tubing, copper 32    |    | a |       |
| Copper rods                   | 00 | a |       |
| Copper wire 23                | 00 | a |       |
| Cut lead sheets 12            | 50 | a |       |
|                               | 25 | a |       |
|                               | 25 | a |       |
| High brass rods 23            | 75 | a |       |
| Low brass sheets 27           | 25 | a |       |
| Low brass wire 27             | 25 | a |       |
| Low brass rods 28             | 00 | a |       |
| Nickel silver, 18% 30         | 50 | a |       |
| Brazed tubing, brass 37       | 00 | a |       |
|                               | 75 | a |       |
| Brazed tubing, copper 41      |    | a |       |
|                               | 50 | a |       |
| Seamless low brass tubing 33  |    | a |       |
| Sheet zinc 12                 | 50 | a |       |

ANTIMONY.-The market continues easier, and quotations are free at 101/4c for spot, while retailers ask 103/8c. London is £72.

GRAPHITE.-The demand is light, with very little business passing. Crude Mexican ore is quoted at \$32.50 per ton New York. Selected amorphous runs between \$50 and \$60 a ton. Korean 33/4c a pound. Madagascar 9c a pound, and Ceylon 4%c to 16c a pound.

TUNGSTEN.-During the past week business in tungsten has been quiet. Most sells are holding for \$7 a unit or over, with buyers bidding close to this figure. Actual sales have been made at \$6.75. According to latest reports from Washington action by the Senate is expected in the next few days on the Tungs-

OLD METALS.—Aluminum clippings are in good demand; castings and old sheets are neglected. Copper is quiet but steady. The demand from consumers is light but dealers are not forcing any sales. Scrap lead is dull, although smelters reduced their price to 71/2c delivered, but very little is obtainable below 73/4c. Block tin scrap and pewter dishes are strongly offered and the market is active.

| Aluminum                    | Buying.                       | Selling.    |
|-----------------------------|-------------------------------|-------------|
| Cast scrap                  | 213/a223/a                    | 243/a25     |
| Sheet scrap                 | 211/4 a 221/2                 | 231/a24     |
| Clippings                   | 241/2a253/4                   | 27½ a28     |
| Copper—                     |                               |             |
| Heavy machinery comp        | .131/2a14                     | 16 a1634    |
| Heavy and wire              |                               | 151/4a151/2 |
| Light and bottoms           |                               | 141/2a15    |
| Heavy, cut and crucible     | .143/a15                      | 161/a17     |
| Brass, heavy                | 7½a 8                         | 9 a 91/2    |
| Brass, casting              | . 9 al0                       | 111/4a111/4 |
| Brass, light                |                               | 81/2a 83/4  |
| No. 1 clean brass turnings. | 81/4a 81/2                    | 91/2a10     |
| No. 1 comp. turnings        | .101/4a103/4                  | 121/a123/a  |
| Tea lead                    | 47/8a 5                       | 51/4a 51/2  |
| Lead, heavy                 |                               | 73/8a 75/8  |
| Zine scrap                  |                               | 51/4a 53/4  |
| Solder joints               | $10\frac{1}{2}a11\frac{1}{2}$ | 123/4a13    |
| New zinc clippings          | . 5 a 5½                      | 6 a 61/4    |
| Pewter dishes               |                               | 45 a46      |
| Block tin. scrap            | .52 a53                       | 55 a58      |

#### Rubber Market Dull

Prices nominally unchanged on the basis of 431/4c for spot ribbed smoked sheets, 431/2c for May arrival, 433/4c for June, 44c for July, 441/4c for August, 45c for September, 451/4c for July-December, 453/4c for October-December, 461/4c for January-March and 463/4c for January-June, with buyers at 1/4c less. Paras and Centrals remained dull and nominal.

| Para-Up-river, fine 401/2a          | 41  |
|-------------------------------------|-----|
| Up-river, coarse                    |     |
| Island, fine 40 a                   |     |
| Island, coarse                      |     |
| Caucho, ball, upper 311/4a          | * * |
| Caucho, ball, lower 271/2a          |     |
| Cameta                              |     |
| Plantation-First latex, crepe 4334a |     |
| Brown crepe, thin, clean 411/2a     |     |
| Rolled, brown, crepe 34 a           |     |
| Smoked ribbed sheets 431/4a         |     |
| CentralsCorinto                     |     |
| Esmeralda 32a                       |     |
| Guayule, wet 25 a                   | 27  |
| Balata, block, Ciudad*56 a          | 57  |
| Balata, block, Panama*44 a          | 45  |
| Balata, sheet*1 00 a                |     |
| Mexican-Scrap*29 a                  |     |

SCRAP-RUBBER.-Extreme dullness prevailed at the close of last week and prices were entirely nominal.

| Boots and shoes     | 71/2a | 75%   |
|---------------------|-------|-------|
| Arctics, trimmed    | 6 a   |       |
| Arctics, untrimmed  | 5 a   |       |
| Tires-Automobile    | 31/4a |       |
| Bicycles, pneumatic | 21/2a |       |
| Hose, steam, tire   | 1 a   | 13/4  |
| Inner tubes, No. 1  | 3     | 143/2 |
| Inner tubes, No. 2. |       | 0     |



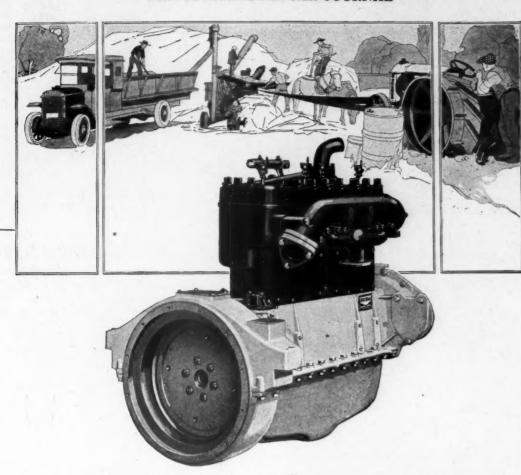
Special Machine for Making Tests Mounted on a Federal Truck

The Frick-Reid Supply Co., Tulsa, Okla., conceived the idea of mounting the apparatus necessary for taking physical tests of casing headgas for determining the amount of gasoline contained in gas. This novel job constructed by the company cost about \$3500. After traveling over bad country the truck upon reaching the well is backed up to within 15 to 30 ft. of it, where the testing plant can be attached readily. It required from 6 to 12 minutes to complete the test on a well. The machine, which weighs about 4000 lb., is operated entirely by the truck engine, the power take-off being mounted on the transmission.

### Clark Axles Shipped by Trucks

The utility of the motor truck as an efficient means of freight transportation was demonstrated by the Clark Equipment Company, of Buchanan, Mich., during the freight congestion incident to the railroad strike. Truck trains were almost daily visitors to the plant from Kenosha, Wisconsin, Saginaw and Mount Pleasant, Michigan, and other cities where companies using Clark axles are located.

The Clark Equipment Company was able to maintain a source of supply by having the incoming truck trains pick up supplies en route and bring them to Buchanan, returning to their own plant with cargoes of Clark axles and steel disc wheels. Due to these "ship by truck" deliveries, the Clark Equipment Company has been enabled to maintain practically uninterrupted production.



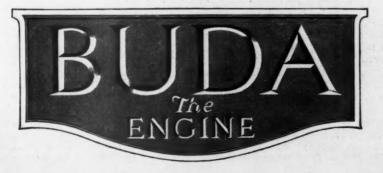
To the Buda engine, especially, thousands of operators attribute the conspicuous thrift and dependability of their Buda-powered trucks.

The Buda name plate on the power plants of 87 representative automotive products means low fuel consumption, responsive power and notable freedom from mechanical trouble.

In every form of truck service the Buda engine has revealed, too, the worth of its simplicity of design, stalwart construction and easy accessibility.

Built in eight models, alike in their ability to deliver uninterrupted and profitable power, there is a Buda engine to meet every truckbuilder's need.

THE BUDA COMPANY, HARVEY SUBURB ILL. ESTABLISHED 1881



# Will Pneumatic Truck Tires Ever Replace Solids?

By HUGO HOFFSTAEDTER, President Polack Tyre and Rubber Company

OTWITHSTANDING all that has been said in the last two years or so about the use of pneumatic truck tires, it remains a fact that only a small percentage of what may properly be called motor trucks (excluding light delivery vans) are equipped with pneumatic tires. It also is a fact that the largest motor truck fleet owners maintain expert engineering staffs whose function it is not alone to keep posted on improvements in their equipment, but to adopt any improvement which is profitable for them to adopthave no thought of changing to pneumatics. By far the larger number of motor trucks remain equipped and are being re-equipped with solid tires. Nevertheless, the assertion is quite frequently heard that pneumatic truck tires are about to supersede solids, and serious attempts are made to reason out that forecast just as, at the time of the first appearance of the so-called "demountable" truck tire, it was predicted that the pressed-on type of tire would not survive.

#### Practicability is the Point

Of course, if it is necessary, or even desirable, to have pneumatics rather than solids on motor trucks, it will be only a question of time before that will happen, but something really practical must be gained by it or it can never become necessary nor desirable.

Looking at the topic from the practical side, therefore, let us try to find the answer to the question whether pneumatic truck tires will ever replace solids.

Mr. J. N. Gunn, president of the United States Tire Company, in an article appearing in one of the trade journals recently, sounds a warning note on the danger of promiscuous change-overs and says that because most trucks are designed for operation on solids, the users may find pneumatics unsuited to their requirements.

In all the articles which appeared in favor of pneumatic truck tires, the main point rests on increased speed to attain an increased radius of action for the purpose of thereby justifying the higher expense of pneumatic truck tires. In other words, doing more work in a shorter time. No attempt has as yet been made to show a reduced up-keep cost by the use of pneumatics over solids, where the factor of speed does not enter, but it seems to be taken generally for granted that, ignoring increased speed, solid tires permit of more economical truck operation than do pneumatics.

Most of our best truck engineers do not hesitate to assert that before pneumatic truck tires can be generally adopted, the present construction of motor trucks would have to undergo a radical revision to make them suitable for greater speeds. A mere change in tire equipment nat-

urally does not change the truck construction, and does not permit the use of the truck beyond the limits which were assumed as a basis in its design. It need hardly be said that such a radical change cannot be made by the vast motor truck industry from one season to the other, but even if found desirable, would necessarily consume a very long time. Whether or not such a departure is desirable is still an open question which confronts the industry. Is it necessary to drive motor trucks at the speed of passenger

Right here it is noteworthy that in all the old established transportation systems, a great difference in speed is being maintained for passengers and for freight, not because freight cannot be transported by those systems as rapidly as passengers, but rather because there exists not the same necessity.

Speed for motor trucking depends, of course, on service requirements which vary with practically every service, but for purposes of this article, only two broad groups of service need be considered:

Long distance and local hauling.

The overland or long-distance hauling by motor truck is of rather recent inauguration, and was largely inspired by the congestion of the railroads, brought about by war conditions. A number of hauling concerns have already gone into the overland freight transportation by motor trucks, and while, no doubt, a great development in long-distance motor trucking will take place, still it would seem that the largest number of trucks will continue to be used for local hauling.

In a well-planned business, requirements are so well anticipated that, with rare exceptions, sufficient time can be allowed for shipments via the cheapest route. Therefore, time or speed—normally—is not so much the factor, and long-distance hauling by motor truck will, therefore, be successful only in proportion to its economy. Local hauling, on the other hand, is indispensable, because there are no rival means at disposal in this horseless age.

But granting that for overland deliveries, because of the greater speed to be attained, pneumatic truck tires are the logical equipment. That sort of service can hardly serve as a gauge by which to determine the right kind of tire equipment for trucks used in local or city service, which, as shown, represents the bulk of motor truck work.

#### Is Speed the Most Essential Requirement?

Analyzing the service which the average city truck is called upon to do, we find that for the most part the distances between two stops are very short. Most of their time is spent in loading, unloading and waiting, and the very little time which could be saved through greater speed, even if permissible, is negligible

for practical purposes. The average city truck does between twenty-five and fifty miles a day, and especially in congested cities, even with increased speed, would have no use for more. Traffic congestion and traffic restrictions in most American cities are such that, irrespective of the speed in the vehicle, it could not be utilized to its full advantage for local deliveries. What can, therefore, be gained by more speed than the present truck construction permits Moreover, the average city street has a smooth surface and is kept in good repair, and the ordinary solid tire affords ample cushion at the speed at which trucks-or for that matter any other kind of vehicle-are allowed to operate.

The practice of overloading trucks is almost universal, and it is very questionable whether such a deep-rooted and general habit can ever be eradicated. Most trucks are designed to carry a reasonable overload and stand up under the abuse which the average truck receives. So are solid tires.

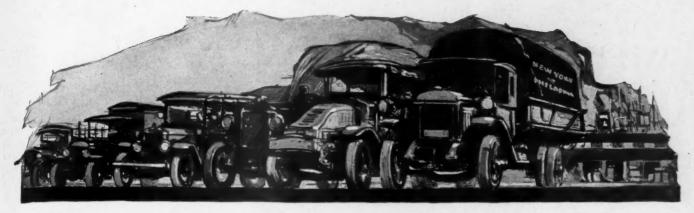
#### Field for Both Types

It seems a good view to hold that solid tires fill a totally different need than pneumatics, and that the two will continue to exist alongside of each other, each in its proper place.

In deciding on their tire equipment, truck owners are best advised to render account to themselves of their particular service requirements. If the truck is intended for city hauling, they will undoubtedly obtain the best results out of solid tires, generally speaking; whereas, for long-distance hauling, it is largely a question of load. For heavy loads, again the solid tire is the logical equipment, whereas, for light hauling, and particularly in the case of perishable goods, the pneumatic tire is the better choice, provided always that the increased speed to be obtained out of pneumatic tires can be fully utilized to compensate for the increased cost of tire up-keep. In such cases, however, the recommendation is in order that the truck owner select a truck which has been designed for speed, and not one which was built for use on solid tires, or else the wearing strain through increased speed may more than offset the difference between the cushioning effect of solids against pneumatics, and the life of the truck may be decreased, in spite of the use of pneumatics.

#### British Commercial Car Statistics

According to latest figures, it is estimated that at present there are 85,000 commercial cars in the United Kingdom. Of these, about 30,000 weigh empty one ton or less, 12,000 from one to 2 tons, 20,000 from 2 to 3, 15,000, 3 to 4 tons, and 8,000 of over 4 tons.



# Economical road transportation depends upon quality vehicles that stand up and deliver mileage

STATISTICS prove that the greatest percentage of truck failures are due not so much to faulty design as to internal part weakness.

The most vital of all internal parts are the bearings. If the bearings wear quickly, the result is misalignment, heating, vibration—early destruction, particularly of transmission and drive.

It is essential, therefore, to secure bearings that not only reduce friction within the power plant and drive, but which wear longest with least necessary attention and no adjustment.

Ball Bearings do this, and almost without exception leading truck manufacturers

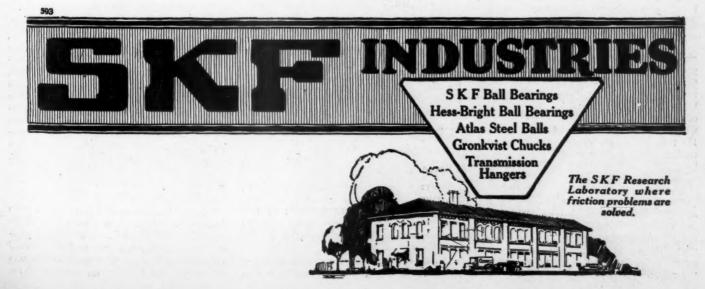
place ball bearings at the points of greatest possible wear. The best evidence of the value of SKF and HESS-BRIGHT ball bearings is the fact that they are built into the vehicles of the majority of the better truck manufacturers.

In SKF and HESS-BRIGHT ball bearings we have not only developed the anti-friction bearing to its highest perfection, but we have further established a scientific research and engineering organization that is shouldering the automotive manufacturers' bearing problems. We are endeavoring to serve American industry through this contribution to the building of better trucks.

Manufacturers are invited to avail themselves of this freely offered co-operation

#### **SKF INDUSTRIES, INCORPORATED**

Sales, Service and Research Division 165 Broadway, New York



## Meet the Small Town Truck Dealer

By H. R. BRATE

T was but a very few years ago that the small town passenger car dealer was as hard to find as the small town truck dealer was last year. They weren't quite as scarce as hen's teeth, but nearly so. Why, no one seemed to know, but the fact that he simply didn't exist was taken as a matter of fact.

But, presto! along last fall the dealer in the small towns awoke to the fact that he was losing something that he should have by letting the dealers in the larger towns and cities sell the trucks in his territory that he ought to be selling. Why he didn't know, but the fact remained that they were doing it and he had not been doing anything to prevent it. In other words, he figured out that he had just been letting some nice business slip away from him. Probably he figured that trucks were for the fellows in the cities to use and not for the farmers, but the fact that there are, according to the government survey taken last year, 3,171 trucks used on the farms in New York state, and 2,773 in Iowa, with Pennsylvania a close third, with 2,760, while Illinois and Ohio tied for the fourth place with 2,261 each, indicates that some one has been selling trucks to the trade that belongs to the small town dealer. This may, I say, set him thinking that he better be getting a little of the cream, and in any event a number of dealers in the small towns got busy last fall.

One of those who started to get busy last year was C. C. Reynolds, of the Reynolds Motor Sales Co., Ithaca, Michigan. Ithaca is a typical small town, of which there are hundreds scattered in equally as good territory through the country. The last census says that this town had about 1800 population. The farmers thereabout are no more prosperous than you will find in the average community, the roads are no better, although they are going to have some mighty good roads very soon, neither is the marketing problem any more acute than you will find in the thousands of other rural sections, but Reynolds is selling trucks.

#### Good Roads Lead to Truck Sales

Last August he decided that he would embark in the truck business, and what probably decided the matter for him more than any other one thing was the fact that Gratiot County, in which Ithaca is located, had decided to build fifty miles of concrete road. He knew that this would call for trucks and more trucks. He talked with the contractors and found that a truck owner could make \$35 to \$40 a day doing hauling, and that they could safely figure on twenty days each a month which would mean from \$700 to \$800 a month gross income for each truck owner, which indicated that they could get back the cost of the investment the first year. Another thing he figured was that if he could get the trucks operating over the county the farmers would see the advantage of having a truck and that

he would be building for himself a future business, while doing a nice business in the meantime.

He decided that the first thing for him to do was to go to the small farmer—the fellow who had a few acres that he farmed and then worked out the rest of the time, and who had saved a few hundred dollars, and put the proposition up to him. He arranged, in the meantime, with an investment company to take care of the paper he would find it necessary to take from these fellows. In September he sold his first "Union" truck, and up to the middle of March, this year, he had sold over twenty trucks and had contracted for over thirty more.

The trucks are sold with a first payment of one-quarter down and the balance in monthly payments. The owners are making better wages than they ever did before, and at the same time are paying for their trucks, while next year, with their trucks paid for, they are not only going to continue making good wages, but will make a good profit besides.

"We don't promise any definite service," said Mr. Reynolds, "but we aim to do the right and square thing, and the boys know it. They must have service or they will lose that \$35 to \$40 a day, and we are not going to let them do it. If a truck is in such shape that they are going to lose a day, we let them take the reserve truck which we kept for just such emergency. We are so organizing our service department that we can give service day or night, and especially at night for that is the time when we can best take care of them. We look over their trucks from time to time and advise them of any condition we find that should be taken care of. We have gotten these fellows to invest upon our recommendation and we are going to see that they are kept going.

## The Dealer in the Small Town Has the Advantage

"Every small town dealer should get into the truck business quick," he continued." There never was a time when the farmers needed trucks as much as he does today, and while we are selling more trucks for road work at the present time, we are not neglecting the farmer and are going after him just as strong, but first he must have the good roads, and we are building them for him."

The dealer in the small town has the advantage over the dealer in the larger towns and cities who is trying to sell to farmers in that the small town dealer knows every farmer for miles around and knows the local conditions. He can follow up his prospects more often and keep in closer touch with them, which is important in selling to farmers, as frequent calls are often necessary to help keep them alive to the advantages of owning and operating a truck.

Another very important reason why the small town dealer should handle trucks

is that he has before him a potential market of at least a million trucks. With over six million farmers in this country, it is reasonable to expect that at least the same ratio of truck owners will exist that does today in automobiles. We can even cut that number in two and still have 500,000 farmers who will be buying trucks during the next few years. The small town dealer has a field that is practically untouched, with a buying public that must have them, for the farmer is learning more and more that his big problem is more one of marketing than anything else. However, once he is sold on the advantage of hauling his crops and products to market with a truck and he would no more return to the old method of making a day of it in going to market and back with horses than he would return to the use of the old carriage after he has once owned an automobile.

#### Selling Trucks a Business Proposition

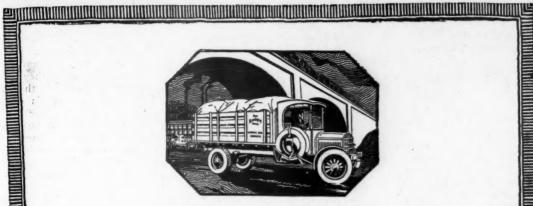
Unlike selling passenger cars where the dealer had to take the whole family out and sell "Ma" as well as "Pa," he must, in order to successfully merchandise trucks, show the advantage of the truck on a dollar and cent basis. It is a part of the farm equipment and just as necessary as is the plow and binder, and the thing that is going to sell the farmer is where he can make money by owning one. At first the farmer couldn't see the self-binder and only a comparatively few would buy them at first. The same was true with the tractor, and so it is with the truck. However, once he is shown the saving he can make in time and money, to say nothing of labor, and which at this time is particularly interesting to him, he is going to buy trucks as he has binders and tractors. Moreover, he has the money with which to buy, and that counts, too.

# Not the American Bronze Corporation of Berwyn, Penna.

E. G. Anderson, president of the American Bronze Corporation, Berwyn, Pa., announces that the American Bronze Corporation, of Berwyn, Pa., manufacturers of NON-GRAN Bearing Bronze, is in no way connected, nor ever has been connected, with any other company manufacturing bearing bronze. This announcement is made to prevent any confusion arising as to its connection with a company of identical name incorporated in another state, against which, according to an item in a recent Philadelphia paper, a petition in bankruptcy has been filed.

The Truck Division of the Detroit Auto Dealers' Association has placed itself on record as in favor of continuing the present plan by which trucks and commercial vehicles are combined with passenger cars in the annual Detroit automobile show.

# GARFORD



Dealers who represent Garford have every argument of service and performance in their favor. Low Cost Ton-Mile delivered to Garford users in every industry, includes all that can be said about truck economy and truck efficiency.

THE CLASTON MATTER THOCK CO.

THE CLASTON ONES. WE WOUld BE A THE STATE OF THE STAT

Parfryd Lima, Ohio

That the United States Army has made Garford a
Class A Standard is another proof of
Garford serviceability

TRUCKS

## Trucks Solve Europe's Greatest Quarry Transportation Problem

ITH her quarries at Seravezza, not far from Pisa, Italy possesses the finest supply of marble in the world, and is the greatest European exporter of this stone. The Seravezza marble quarries have been in active operation since 1517, when Pope Léon X instructed Michael Angelo to exploit these regions, and since then they have furnished material for the finest palaces and churches in Rome, Florence, and other Italian cities.

#### Transportation the Big Problem

From the outset transportation was the greatest difficulty to be overcome in connection with the working of these quarries. The marble is quarried out of the mountain side, to an altitude of 4000 ft., and roads have to be made as the work proceeds. The gradients are high, running up to 40 per cent in many places; in addition the turns are very sharp, and except on the main approaches all the roads are thickly strewn with loose stone.

The blocks of marble, weighing 15 to 20 tons each, have to be handled with the greatest precaution and call for an infinite amount of hand labor. Until quite recently ox-teams have been made use of almost exclusively for the hauling of blocks of marble in these quarries. The work with these animals is naturally slow, for even on good roads they do not travel more than 2 m.p.h. For the biggest loads it is necessary to use 16 to 18 pairs of oxen, which cover a total length of not less than 250 ft. This length is most disadvantageous, for it not only necessitates the presence of 20 or more drivers, but on the steep winding portions of the mountain only a small number of animals can do really useful work.

#### Steam Locomobiles Were Adopted

In an attempt to solve the transportation problem, steam locomobiles were adopted and proved fairly successful on the good roads, notwithstanding the high cost of fuel and maintenance. These locomobiles were not found suitable, however, for bringing stone from the mouth of the quarry or for traveling over rough surfaces and climbing the steepest gradients.

The most recent adoption, and one which has been entirely successful, is that of the Fiat 70 hp. petrol tractor. This



Bringing a Block of Marble Down the Mountain Side. From This Point It Will be Taken Away on a Tractor

has been tried in competition with both locomobiles and ox-teams and has given such good results that it is now substituting both. Its greatest advantages are speed and lower operating costs. The maximum useful load handled may be taken at 30 tons. This would entail the

presence of 18 drivers, one for each pair of oxen, and at least six men to be in attendance for applying the brakes and for assistance when on the difficult turns. With the Fiat tractor only one driver is required and four men are quite sufficient to accompany the load over the difficult portions of the road. This means a saving of the labor of 19 men.

The overall length of the tractor being only 16 ft., no great difficulty is experienced in getting round the sharp hairpin turns, even when they are on a gradient of 20 per cent. If the trailer, on which the greatest load is carried, cannot be taken round by direct haulage, the tractor first makes the turn and then pulls its trailer or trailers around by means of its engine-operated winch. In this way it is possible to get big blocks of marble from positions which would be altogether inaccessible to ox-teams, or which would entail the building of special roads at very considerable expense.

#### Engine Develops Seventy Horsepower

The petrol tractor employed for this work is a type produced before the war by the Fiat company and employed very extensively during the war for the haulage of big guns. Its engine is a fourcylinder vertical type bore and stroke of 130 and 200 mm., respectively, developing 70 hp. Except, of course, in the matter of dimensions, the general construction of the tractor follows that of the Fiat trucks. There are four speeds and reverse, and the final drive is by means of enclosed chains. While the front wheels are ordinary cast steel fitted with solid rubber tires, the rear wheels are all-steel, with a diam. of 47 in., and are designed to receive special creeper bands. This really constitutes an endless chain with eight very broad links. They are fastened to studs on the circumference of the wheel. and travel round with it, increasing the adherence and making it possible to travel over country which would be impassable without this device. On good roads these bands are not needed, but in the quarries they are always in service.

## Transmission and Rear Wheel Brake Are Used

For work in such a district very close attention has to be paid to brakes. The foot brake operates on the transmission, and the rear wheel brakes are controlled by hand. In order to facilitate descents, the two rear wheel brakes can be operated simultaneously or independently. This is of great value when taking a sharp turn on a steep down grade.

Most of the load is carried on four-wheel trailers, the tractor itself only receiving a useful load of 3½ tons. Over good, level roads the Fiat tractor can haul 100 tons, but in the quarries it is rarely that more than 30 tons are taken at one time. Such a load is generally distributed over two trailers.



For Very Short Distances, the Blocks of Marble Are Put on Skids and Dragged Along the Ground by Means of the Tractor

# MARTIN CUSHION WHEELS

FOR MOTOR TRUCKS

No Bolts
No Nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable



Backed by Nine Years' Experience in Building Good Cushion Wheels

Adopted for Standard Equipment on "OLD RELIABLE" MOTOR TRUCKS

1½ to 7 Ton

## MARTIN CUSHION WHEEL CO.

311-13 N. SANGAMON STREET CHICAGO, ILLINOIS
BRANCHES AND SERVICE STATIONS IN ALL PRINCIPAL CITIES
PRICES ON REQUEST

## Electric Welding Plant Made Portable by Mounting It on a Packard Truck

URING the last few years great strides have been made in the process of welding iron and steel. Repairs that would have been impossible a comparatively short time ago are now quickly and efficiently made by the electric arc welding method, and it is now possible to weld cast iron, wrought iron and various grades of steel so that the tensile strength of the weld is from 80 per cent to 100 per cent of the original metal. The electric arc method of welding is not only used for repairing boilers, steel plate work and broken parts of cast iron or steel, but is also used largely in the fabrication of new iron and steel parts, filling in defective castings, reclamation

Barges for marine work, with electric generators and arc welding outfits, have been in use for some time and have proved entirely satisfactory, but until recently no self-contained portable outfit for land work has been developed.

The first portable, self-contained land equipment ever built so far as is known is mounted on a Packard five-ton chassis. This is a very special job in every way, and it is a striking example of the uses to which motor trucks can be put. The

Exterior View of

Mounted on the chassis is a body, which provides a workroom and contains a generator driven by a kerosene motor, a 90-ft. air compressor, extra fuel and oil tanks and drum for carrying wire used in connection with the arc welding tools and hose for the compressed air tools. This body is electrically lighted throughout with current supplied by the electric generator.

The kerosene engine is coupled up direct with the generator, and, by a very

ingenious arrangement, worked out by the Covic Electric Company, it is governed so that loads put on the generator while welds are being made do not greatly affect the speed of the motor, as the throttle is automatical-

ly opened and shut, thus keeping the speed of the motor and generator steady at all times.

This generator outfit supplies enough current for two generators. A special power take-off was designed by the Packard Motor Car Company to operate the air compressor. This power take-off is driven by the truck motor, and it develops approximately 20 hp. at 250 rpm. A mammoth Morse chain is used to transmit the power from the transmission to the air compressor. The compressor supplies air to pneumatic hammers, chisels and other air-driven tools used in preparing materials to be welded. The reels carry 1500 ft. of welding leads and work can be done at considerable distance from the truck. Aside from the standard Packard truck equipment, there has been installed a 40-gal, tank for fuel, a 25-gal. tank for lubricating oil; also two large tanks for compressed air.



Showing the Air Compressor, Kerosene Engine and Electric Welding Machine Mounted on a Packard Truck Chassis Prior to the Attaching of a Special Body to Cover It

is either impossible or prohibitively expensive to bring parts to the welding plant, and, as a special generator having the proper electric characteristics was necessary, it became imperative that some kind of portable outfit be developed. Covic Electric Co., New York, recognized the need for such an outfit, and, after an exhaustive investigation of all the details entering into the construction, decided to mount this apparatus on a Packard five-ton chassis.

#### New Motor Transportation Company in South Dakota

The American Motor Express Company, of Sioux Falls, S. D., is the first large rural motor transportation company of its kind to be organized in that state. This company has purchased a fleet of 17 Patriot trucks equipped with special freight bodies and operates these trucks on regular schedules over eight different routes out of Sioux Falls.

Because of the fact that perishable foodstuffs are handled, a special type of body was designed for this company by the Patriot Motors Co., Lincoln, Neb. These bodies are 13½ ft. long, 6 ft. wide and 6¼ ft. high. The walls and ceiling are double, being constructed of "Vehi-

sote" on the outside and ceiling on the inside. These bodies can be loaded through doors on either side and in the rear, the rear doors being built in two sections, so that the upper and lower half can be opened independent of each other. Each body is equipped with an exhaust heater to protect the cargo in cold weather. According to Mr. Marvin, an official of the American Motor Express Company, this type of equipment is proving exceptionally satisfactory in handling merchandise on the outgoing trips and farm produce on the return run. He states that during the recent blizzard in that section, when all other transportation was tied up, his company was able to operate their trucks on schedule time.

#### Motor Trucks Have No Terror for Heavy Loads

The Austin Co. of Toledo, wanted an eight-ton boiler hauled a distance of 70 miles. It was at first questioned whether it was advisable to move the boiler by truck. Harrison Bros., a trucking company, finally got the job on their promise that they would get the truck to Toledo without mishap. The huge boiler was rolled along to its destination as though it were an ordinary every-day load on a Federal truck.

Durston Gear Corporation, Syracuse, N. Y., has doubled its capacity and production and has added a new model transmission to its line.

# Handle Heavy Truck Wheels with an

# ATLAS WHEEL CRANE

Heavy truck wheels weigh from five hundred pounds up to over half a ton. Removing or mounting such a wheel by hand or with makeshift tools often takes three or four men an hour. It's a day's job to grease or adjust the bearings all around. Figure out for yourself what this costs in labor and idle truck-time. Don't forget that in the struggle with the wheel, bearing surfaces are often nicked and brake linings torn, and that the men are always exhausted and sometimes injured.

### One Man-One Minute

With the ATLAS WHEEL CRANE, one man can remove or mount the heaviest wheel in one minute. There is absolutely no danger to man or truck. Adjustment of bearings becomes a small job, and the truck loses practically no time.

#### Pays for Itself in Time and Labor Saved

The ATLAS WHEEL CRANE is simple and certain in operation, completely adjustable to any wheel or tire, and powerfully constructed. It will pay for itself in a few weeks in labor-saving alone. And it keeps the trucks in operation. It saves injury and damage. The men will appreciate it—ask your forcemen.

#### Simple in Operation

The grab hooks reach under the fender and grip the steel rim on each side of the wheel. A few turns of the crank holst the wheel the short distance necessary to lift it free of the axle. The crane with the suspended wheel is then rolled back from the truck. That's all.

A simple adjustable stop holds the wheel in vertical position, and it can therefore be remounted without any preliminary lining-up. The crane is simply rolled to the axle and the wheel slipped into place with one easy motion. Turn the crank and the grab hooks are free.

#### Fully Adjustable

Splice bars quickly adjust the grab hooks to any width of wheel. Special hooks are furnished for pneumatic tires. Very small clearance between wheel and fender or body is required. Two ranges of vertical lift provide for variations in wheel-height.

#### **Powerfully Constructed**

Grab hooks, crane arm, and standards are drop-forged steel. The base is heavy forged channel steel. Casters are of cast iron. All other parts are machine steel. The grab hooks have positive grip, like ice tongs—the heavier the wheel, the tighter the grip. The ATLAS WHEEL CRANE has a wide margin of safety, for it will lift a ton and will not break.



# The Revolvator, a Tiering and Truck Loading Machine

PORTABLE revolvable elevator operated by hand or electric motor, for use in the storeroom or warehouse for stacking and tiering cases, bales, boxes, barrels, etc., clear up to the ceiling, leaving no waste space because it renders wide aisles unnecessary, and a machine that is also extremely useful for loading trucks with heavy bulky material with little inconvenience, is the product of the Revolvator

To hold the Revolvator rigid so that it will not change its position on the floor, a floor lock is used. This device gives four widely separated points of support. To lock the Revolvator the steel lever is thrown forward and forced down until the weight of the front part of the machine is lifted off the swivel wheel and is carried by the bearing lugs of the lock. The machine cannot upset as anything that is not too large to balance on the platform

to the back of the machine. They can, however, be turned parallel to the sides of the platform. This makes it possible to pull boxes or bales off the machine backwards or sidewards. Although for use in connection with soft materials such as bales, bags, sacks, etc., a flat wood platform is furnished.

This company also manufactures an electric driven Revolvator furnished with any standard type motor for operating on any commercial circuit. The special advantages of the electric motor driven Revolvator are that loads can be raised at a much higher speed than by hand and that the energy of the operator is not consumed in cranking. The machine is provided with an automatic over-travel limitation device which automatically brings the platform to a stop before reaching the top of the uprights. The motor is operated by means of a reversing operator's switch having three positions for the handle, namely, "down", "off" and "up". When thrown to the "off" position a mechanical brake is automatically applied, so that elevating platform is held stationary without creeping.

The prices for either the hand operated or electric driven Revolvator may be obtained on application.

The raising and lowering operation to adjust the apparatus to any wheel diameter is performed by a crank adjustment. As the drag is operated from beneath, overhanging bodies cannot interfere with its operation.

The frame or carriage is made of 2-in. pipe and the legs which are mounted on three casters, one on a pivot point and the other two in alignment with the pipe or side rail.



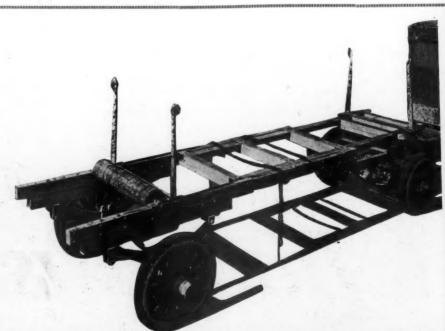
The Revolvator Not Only Conserves Man Energy But Facilitates Loading, Saving Time and Money.

Co., Jersey City, N. J. It is built strong and durable and in various sizes, handling any weight up to 1800 lb. or over.

With this machine, which can be wheeled to any place in the storeroom or warehouse, the case or barrel placed on its platform is easily and quickly elevated, the platform is then revolved to the desired position, and the article lifted, pushed off. The heavy work of lifting or pushing up heavy articles is transformed to the simple operation of crank operating the gear lifting mechanism.

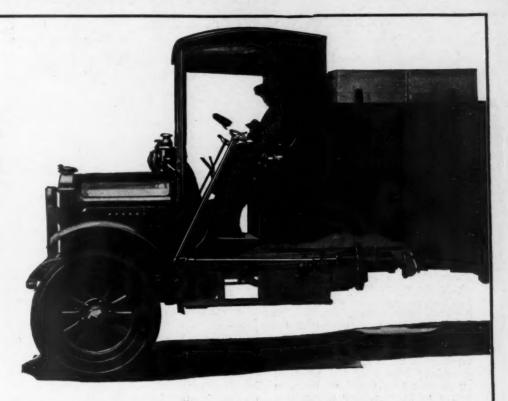
This apparatus consists of two uprights, an elevating platform and a revolving base which can swing around on its own center like a turntable. This revolving base is a distinct feature of the Revolvator.

The upper structure may be revolved on the lower base or frame without moving the lower base on the floor. The base is locked together automatically in four different positions. The two uprights are jointed, allowing the top half to fold over, this hinging frame construction permits of passage through low head room, sometimes necessary when transferring the machine from one place to another. No danger of injury due to the crank handle flying backward is possible, as it must be taken off the elevating shaft and put on the lowering shaft to open the brake jaws to allow the platform to descend. load is sustained independently of the crank by a ratchet, which sustains the load at every point. The ratchet and pawl are always in action and cannot be operated by the crank or interfered with in any can be handled with perfect safety, and for unusually bulky loads, a base of sufficient size to always keep the center of gravity of the load within the area of the base, is provided. The platform of the standard Revolvator which is provided with two sets of gears, one for high and one for low speed is provided with four removable and interchangeable rollers. These rollers are normally parallel



A Popular Ranger Trailer, the Self-Unloading Two-Wheel Lumber Model. Built by the Southern Motor Manufacturing Association, Ltd., Houston, Texas

# POWER-RITE Transmissions Have Simple Steering-Post Control





The Power-Rite Constant – Mesh Transmission makes possible the changing of driving speeds by simply moving a lever on the steering-post—in the same manner as the spark or throttle lever.

Shifting of gears is entirely eliminated—because the gears of the Power-Rite are constantly in mesh.

Changing of speeds thus becomes merely a matter of speed "selection." By the simple operation of moving a lever on the steering-post, the desired speed is instantly attained without the need of the cumbersome gear-shift.

Power-Rite has demonstrated its practicability on both motor cars and motor trucks as a quiet-running transmission which effectively eliminates grinding, stripping and locking of gears. The simplicity of its construction makes possible a reduction of approximately 25% in transmission weight.

These and many other superiorities over transmissions of the older type have won for the Power-Rite the approval of leading engineers in the automotive industry.

Blue prints and descriptive literature on request. Gear sets supplied for test purposes to automobile and truck manufacturers.



#### **Chamber of Commerce Meet**

(Continued from page 17)

on motor vehicle owners, Mr. Graham stated that it would be well to remember that more than motor vehicles use the roads and more than motor vehicles benefit thereby.

#### The Value of Good Roads

Mr. Graham told of what had been accomplished in transporting food by motor trucks, and said he thought there is a great field for future economy in food through intelligent transportation by truck. "The saving of two cents per quart on milk, made possible by concrete roads into Milwaukee, saves the people of that city over a million dollars a year," said Mr. Graham.

Mr. Graham made a strong plea for the assistance of the business men present in helping the motor truck to its proper place in relation to existing transportation methods, and to protecting the truck from ill-advised legislation, stating that the truck is an economic asset, not a liability, and should always be considered as such. He urged good roads as a necessity for truck haulage expansion, and promised that pneumatic tires would do much in the future to help conquer the present

prejudice against heavy trucks using the

public highways. His idea is that "the highways should be the servant, not the master, of transportation.'

After outlining the acclaim with which great discoverers have always been greeted, Mr. Graham pointed out that no discovery means as much to humanity as a new method of transportation, and this is what the motor vehicle has been.

At the afternoon group meeting several speakers of national repute were heard under the general subject of highways.

#### The Need for More Intelligent Truck Operators

Colonel Taylor, chief of the Motor Department of the Transport Corps, East, U. S. A., told of what the war did for motor transportation, and urged the development of a better type of truck driver, one with initiative, intelligence, loyalty, etc., as one of the requisites for bettering highway service by trucks.

Roy D. Chapin, president of the Hudson Motor Car Company, and chairman of the highway transport committee during the war, spoke of the importance that all highways have become, pointed to what had developed in the past five years.

and said no one could tell what another five years will bring forth. "We must build roads where they are economically necessary, otherwise with the great funds at our disposal we will spend millions where they are not necessary," said Mr. Chapin.

#### Road Program Has Grown

In making a plea for a Federal road commission to handle the roads of the country, Mr. Chapin said it had become impossible for a subordinate bureau of the agricultural department to handle the vast road building programs that have become necessary. The commission can help develop transportation, as well as build the roads, thinks Mr. Chapin. Mr. Chapin outlined the benefits to be derived under the Townsend bill, and urged its adoption.

The Chamber was offered a resolution unanimously at this group meeting, urging action in connection with roads which would be accomplished by the Townsend

Other speakers at the group meeting were W. A. Alsdorf, of Ohio; Luke W. Duffey, of Indianapolis; W. F. Knowles, of New Jersey; P. St. John Wilson, chief engineer for the road department of the department of agriculture, and W. J. L. Banham, general traffic manager of the Otis Elevator Company.

## Activities of the Motor Truck Association of Philadelphia

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THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

Sounding a plea for more advertising among truck men, H. B. Harper, president, of the Overland-Harper Co., and also President of the National Automobile Dealers Assn., was one of the principal speakers at the April meeting of the Motor Truck Assn. of Phila., held at the Hotel Adelphia, Wednesday, April 21st.

In outlining his observations on motor truck business, Mr. Harper said: "Transportation is America's supremacy. Trucks saved the situation in the recent railroad

strikes and tie-ups. Many of them don't live up to the business they represent. Ninety per cent. of the truck dealers should be out of business and should be in some other line of business."

Councilman William W. Roper, another speaker of the evening, also advocated

better roads for Philadelphia and vicinity. Secretary, W. H. Metcalf, on behalf of Artie Bittong, Chairman of the Entertainment Committee, who was in Washington, reported that the annual outing will be held June 12th, at Kugler's Mohican Club on the Delaware. Members of the Phila. Automobile Trade Assn., Automobile Accessories Business Assn., and Camden Automobile Trade Assn. will also attend. A committee of three, consisting of J. D. Howley, Thos. K. Quirk and O. W. Doolittle was appointed to represent the Motor Truck Association in the Ship By Truck Tour to be held the week of May 17th to 22nd.

#### Trailer Business Increasing Fast

NEW YORK, May 1 .- As many trailers were manufactured and sold during the first three months this year as during the whole of last year. The production would have been greater if the manufacturers could have secured deliveries of parts and materials and been able to ship the finished trailers. Demand for trailers has increased satisfactorily during the last six months, and a steadily increasing

volume is anticipated by manufacturers.

During a three weeks' trip, covering about 3000 miles, among the factories from New Hampshire and Massachusetts to Illinois and Wisconsin, H. W. Perry, general manager, and H. C. Fruehauf, vice-president, of the Trailer Manufacturers' Association, found great activity

in the industry. The factories are behind on orders from four to six weeks and in some cases from \$200,000 to \$300,000, because of inability to secure deliveries of axles, springs, bearings, castings, forgings, and even bolts and other small hardware. Severe winter storms, freight embargoes and the recent railroad strike have greatly interfered with shipments of finished trailers during the winter and early spring. Despite these handicaps, shipments have increased each month, and as shipping approaches normal again, the production will rise proportionately.

#### A Farm Products Director for Maryland

A Director of Farm Products of Maryland is proposed in a bill before the Senate of Maryland, which provides authority "to maintain and operate in the discretion of the Director of Farm Products, motor lines along the state highways to and from markets, and to maintain a service to and from terminals, docks and depots for the collection of farm products and produce and to establish a system of charges or rates or tariffs for the collection and the hauling thereof in addition to the commission for the sales of such

Vol. XIX

PHILADELPHIA, JUNE 15, 1920

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets

Philadelphia, U.S.A.

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#### TABLE OF CONTENTS

| Advertisers' Index   | 318      |
|--|----------|
| Buyers' Index of Reading and Advertising Pages                             | 312      |
| Commercial Car Specifications  | 71       |
| Editorials   | 29       |
| Equipment and Appliances   | 47       |
| Metal and Rubber Markets   | 116      |
| New Commercial Cars  | 41       |
|  |          |
| News of the Trade (Including Personals, New                                |          |
| News of the Trade (Including Personals, New Agencies, Factory Items, Etc.) | 31       |
|  | 31<br>82 |
| Agencies, Factory Items, Etc.)   |          |
| Agencies, Factory Items, Etc.)   | 82       |
| Agencies, Factory Items, Etc.)   | 82<br>67 |

| or normal maritables                               |    |
|--|----|
| Formulate Plans for Standardization of Wheel Hubs  | 17 |
| Factory Service Managers, Indianapolis Convention. | 18 |
| Building Big Suburban Business With Trucks         | 20 |
| Tractor and Semi-Trailers Solve Haulage Problem.   | 22 |
| Philadelphia's Educational Ship-by-Truck Tour      | 24 |
| Motor Truck Terminal for Indianapolis              | 26 |
| Hub Standardization for Wheels and Axles           | 27 |
| The Retail Truck Dealers' Cost of Doing Business   | 28 |
| Central California Tour Had Sixty Trucks in Line   | 34 |
| Sketches of Suitable Bodies Helps Sell Trucks      | 35 |
| Hauling Tire Fabric From New England to Akron.     | 36 |
| Protecting the Truck Tradesman's Matter            | 37 |
| Selling Customer on Service—Sells Trucks           | 38 |
| Relation of Factory Sales Organization to Dealer   | 40 |
| Observations vs. a Veteran Truck Salesman          | 51 |
| An Interesting Letter for Dealers to Read          | 52 |
| When Tommy Studied Human Nature                    | 58 |
| Diamond-T Direct Mail Consumer Advertising         |    |
| Campaign   | 83 |
|  |    |

| When a Bus Line Becomes Unprofitable              | .8 |
|---|----|
| Overloading Dump Bodies is an Expensive Policy.   | 81 |
| Bus Line Operated in Competition With Street Cars | 9  |
| Manufacturer Urges Truck Shipments                | 9  |
| Talks With Dealers                                | 9  |
| Truck Shipments Save Chicago Building Tie He      | 10 |

|         |        |      |      | SU    | BS           | CRI            | PT         | ION   | R.   | ATE | 18   |     |      |       |      |        |
|---------|--------|------|------|-------|--------------|----------------|------------|-------|------|-----|------|-----|------|-------|------|--------|
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# PRECISI BALL BEARINGS

(PATENTED)

Satisfactory service is the one criterion of success, in a machine or in a part of a machine. One failure will wipe out a record that has been months in the making. Year after year, "NORMA" equipped magnetos and lighting generators hold their unchallenged leadershipsolely by virtue of their consistently superior service maintained under the most exacting conditions known in the automotive world.

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Anable Avenue Long Island City New York



Ball, Roller, Thrust and Combination Bearings





The Final Verdict

Motor Truck users are being educated to watch maintenance and operating costs. Most of your buyers would watch their costs, even without urging, because, as business

men, they desire to know whether your truck is the economical, efficient vehicle you have claimed it to be.

You may be able to show a number of single sales, but Mr. Manufacturer, your ultimate success and the final success of your dealers rest on the records produced and not on claims.

Bossert Pressed Steel Parts will enable your truck to maintain a low operating cost, because they rid it of hundreds of pounds of excess weight. More than 200 Bossert Parts are made, many of which you could substitute immediately for the heavier, bulkier castings or malleable iron parts you may now be using.

The final verdict of your users is going to rest on the facts presented to them by their delivery managers or truck drivers. Less gas, less oil, less unsprung weight—more strength, more dependability, more safety—these are the results achieved by the wise decision to replace heavy parts with Light-Weight Bossert Parts. Our Engineers await your decision. They are ready to serve you in advising how Bossert lightness can lower operating costs of your truck.

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